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This Page Intentionaly Left Blank that any Tug-N-Turns in use are still

capable of turning.

22. J.B.I. shall not contest a United States government subpoena for J.B.I. representatives to testify at a trial related to the Tug-N-Turn in any court in the United States. The government will provide fees and allowances to any subpoensed witness in accordance with 28 Ŭ.S.C. 1821.

23. Upon provisional acceptance of this Settlement Agreement and Order by the Commission, the Commission shall place this Agreement and Order on the public record and publish it in the Federal Register in accordance with the procedures set forth in 16 CFR 1118.20(e)-(h). If the Commission does not to accept the Settlement Agreement and Order within 15 days of such publication, the Agreement and Order shall be deemed finally accepted and the Final Order shall issue on the 16th

24. Upon final acceptance of this Settlement Agreement and Order, the Commission shall issue the attached

Order.

25. A violation of the Order shall subject the parties to appropriate legal action.

J.B.I. Inc.

Jay Buchbinder.

President, J.B.I., Inc.

The Consumer Product Safety Commission

Eric A. Rubel.

General Counsel.

David Schmeltzer,

Associate Executive Director, Office of Compliance and Enforcement.

Eric L. Stone.

Acting Director, Division of Administrative Litigation, Office of Compliance and Enforcement.

Pated: February 1, 1995. Ronald G. Yelenik

Trial Attorney, Division of Administrative Litigation, Office of Compliance and Enforcement.

Dated: February 1, 1995. Jayme Rizzolo Epstein. Attorney, Office of General Counsel.

Upon consideration of the Settlement Agreement between the staff and Respondent, and it appearing the Settlement Agreement is in the public interest, it is

Ordered, that the Settlement Agreement be and hereby is accepted, as

indicated below; and it is

Further ordered, that Respondent upon final acceptance of the Settlement Agreement, shall pay to the U.S. Treasury a civil penalty in the amount of two hundred twenty five thousand

dollars (\$225,000), within twenty (20) days after service of this Final Order.

Provisionally accepted and Provisional Order issued on the 8th day of November,

By Order of the Commission. Sadye E. Dunn,

Secretary, Consumer Product Safety Commission.

[FR Doc. 95-28347 Filed 11-15-95; 8:45 am] BILLING CODE #355-01-M

#### DEPARTMENT OF DEFENSE

#### Department of the Navy

Notice of Intent To Prepare an **Environmental Impact Statement for** Construction and Operational Changes Associated With Realignment of F/A-18 Aircraft to Naval Air Station Oceana, Virginia Beach, VA From Naval Air Station, Cecil Field, FL

Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental consequences of the realignment of F/A-18 aircraft and their associated personnel to Naval Air Station (NAS) Oceana, located in Virginia Beach, Virginia. This action is being conducted in accordance with the Defense Base Closure and Realignment Act of 1990 (Pub. L. 101-510), as

implemented during 1995. In accordance with congressional direction implementing the 1995 recommendations of the Defense Base Closure and Realignment Commission (BRAC 95), the Navy will close NAS Cecil Field, Florida, and realign F/A–18 aircraft, personnel, and ancillary activities associated with the existing F/A-18 aircraft, personnel, and ancillary activities associated with the existing F/A-18 missions. F/A-18 assets from NAS Cecil Field will be distributed to support the Navy's operational mission by use of existing infrastructure and capacity, elimination of substantial new construction, and maintenance of operational flexibility for deployment. For BRAC 95, two F/A-18 reserve squadrons are proposed to be sent to NAS Atlanta for integration with Naval Reserve Forces and two operational squadrons are proposed to be sent to MCAS Beaufort to establish joint operations capability with existing Marine Corps F/A-18 assets. These two moves will be addressed in separate NEPA documentation. The remainder of

F/A-18 assets (up to ten squadrons) are proposed to be sent to NAS Oceans and is the subject of this EIS. The move to NAS Oceana includes approximately 175 aircraft, 3,600 military personnel, and 200 civilians. In order to accommodate this realignment, approximately 200,000 square feet of new/existing facilities will be constructed or modified. In addition, the realignment will result in a greater level of aircraft operations at NAS Oceana, at Naval Auxiliary Landing Field (NALF) Fentress, located in Chesapeake, Virginia, and within various aircraft training ranges and warning areas in and adjacent to Virginia and eastern North Carolina, including Dare County, BT-9 (Brant Island Shoal), and BT-11 (Piney Island).

The Navy intends to analyze the potential impacts of the realignment on the natural environment, including but not limited to air quality, plant and animal habitats, and water resources, such as streams and wetlands. It will also evaluate potential effects to the built environment, including land use patterns, cultural resources, transportation, housing, community services, and the regional economy. Further, the Navy will be preparing analyses of the projected operations of the incoming F/A-18 aircraft on the existing airspace range structure in Virginia and eastern North Carolina, and on aircraft noise exposure levels in and around NAS Oceana and NALF Fentress, and training areas in Virginia and North Carolina.

In accordance with the Clean Air Act, as amended in 1990 (42 U.S.C. 7401– 7661q), as implemented by the **Environmental Protection Agency** Regulations on Determining Conformity of General Federal Actions to Federal or State Implementation Plans (40 CFR Parts 6, 53, and 93), the Navy will conduct a conformity review, assessing whether total direct and indirect air emissions associated with the realignment are consistent or in compliance with all relevant requirements and milestones contained in the relevant State Implementation Plan (SIP). All required public comment periods, hearings and notices associated with the conformity review will be conducted concurrently with those associated with the EIS.

The Navy will initiate a scoping process for the purpose of determining the scope of significant issues to be addressed in the EIS related to the proposed action. The Navy will hold five public scoping meetings on the following dates: December 5, 1995 beginning at 7 p.m. at the Carteret County Courthouse, Courthouse Square,

U.S. Route 70, Beaufort, North Carolina 28516; December 6, 1995 beginning at 7 p.m. at the Pamlico County Courthouse, NC Highway 55 (near NC Highway 304), Bayboro, North Carolina 28515; December 7, 1995 beginning at 7 p.m. at the North Carolina Aquarium and Marine Resources Center, Main Auditorium, Airport Road (adjacent to the Dare County Airport), Manteo, North Carolina 27954; December 12, 1995 beginning at 7 p.m. at the Seatack Elementary School, Main Auditorium, 411 Birdneck Circle, Virginia Beach, Virginia 23454; and December 13, 1995 beginning at 7 p.m. at the Butts Road Intermediate School Gymnatorium, 1571 Mount Pleasant Road, Chesapeake, Virginia 23322.

Following a presentation on the EIS process and the Navy's proposed action, Navy representatives will be available at these meetings to receive comments from agencies and the public regarding issues of concern. It is important that federal, state, and local agencies and interested persons take this opportunity to identify environmental concerns that should be addressed in the EIS. In order to ensure adequate time for those wishing to make public comments, speakers will be limited to five minutes.

Agencies and the public are also invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the scoping meeting. To be most helpful, scoping comments should clearly describe the specific issues or topics that the commenter believes the EIS should address. Please mail written comments no later than January 5, 1996 to: Commander, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Atin: Code 2032DC (Mr. Dan Cecchini), telephone (804) 322—4891, fax (804) 322—4894.

Dated: November 13, 1995. M.A. Waters,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 95-28299 Filed 11-15-95; 8:45 am] BILLING CODE 3810-77-M

#### **DEPARTMENT OF EDUCATION**

National Educational Research Policy and Priorities Board; Meeting

AGENCY: National Educational Research Policy and Priorities Board; Education. ACTION: Notice of closed meeting by teleconference.

SUMMARY: This notice sets forth the schedule and proposed agends of a forthcoming meeting of the Executive

Committee of the National Educational Research Policy and Priorities Board. Notice of this meeting is required under Section 10(a)(2) of the Federal Advisory Committee Act. This document is intended to notify the general public of the meeting.

DATE: November 21, 1995.

TIMES: 11 a.m. to noon.

LOCATION: Room 604e, 555 New Jersey Ave., NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: John Christensen, Designated Federal Official, Office of Educational Research and Improvement, 555 New Jersey Ave., NW., Washington, DC 20208-7579.
Telephone: (202) 219-2065. Internet: john-christensen@ed.gov.

SUPPLEMENTARY INFORMATION: The
National Educational Research Policy
and Priorities Board is authorized by
Section 921 of the Educational
Research, Development, Dissemination,
and Improvement Act of 1994. The
Board works collaboratively with the
Assistant Secretary for the Office of
Educational Research and Improvement
to forge a national consensus with
respect to a long-term agenda for
educational research, development, and
dissemination, and to provide advice
and assistance to the Assistant Secretary
in administering the duties of the Office.

The meeting of the Executive Committee is closed to the public under the authority of Section 10(d) of the Federal Advisory Committee Act (Pub. L. 92-463; 5 U.S.C. Appendix 2) and under exemption (6) of Section 552b(c) of the Government in the Sunshine Act (Pub. L 94-409; 5 U.S.C. 552b(c)(6)). The committee will discuss candidates for the position of executive director and touch upon matters that would disclose information of a personal nature where disclosure would constitute a clearly unwarranted invasion of personal privacy if conducted in open session. The meeting will be closed under the authority of Section 10(d) of the Federal Advisory Committee Act (Pub. L. 92-463; 5 U.S.C. Appendix 2) and under exemptions (2) and (6) of Section 552b(c) of the Government in the Sunshine Act Pub. L. 94-409; 5 U.S.C. 552b(c). The Executive Committee will consider matters that relate solely to the internal rules and practices of the Board and personal qualifications and experience of potential candidates for the position of executive director, matters that would disclose information of a personal nature where disclosure would constitute a clearly unwarranted invasion of personal privacy if conducted in open session.

A summary of the activities at the closed session and related matters which are informative to the public consistent with the policy of Title 5 U.S.C. 552b(c) will be available to the public within 14 days of the meeting.

The public is being given less than the required 15 days' notice because of the difficulty in accommodating the schedules of all members of the Executive Committee, which must complete its recommendations prior to the next full Board meeting on November 30.

Records are kept of all Board proceedings, and are available for public inspection at the office of the National Educational Research Policy and Priorities Board, 555 New Jersey Ave., NW., Washington, DC 20208-7564.

Dated: November 9, 1995.

Sharon P. Robinson,
Assistant Secretary.

[FR Doc. 95-28252 Filed 11-15-95; 8:45 am]
BILLING CODE 4000-01-M

#### **DEPARTMENT OF ENERGY**

Federal Energy Regulatory Commission

[FERC Docket No. CP95-35-000 and PRPB \
Docket No. 94-62-1219-JPM]

EcoEléctrica, L.P., Notice of Availability of the Draft Environmental impact Statement/Preliminary Environmental Impact Statement for the Proposed EcoEléctrica LNG import Terminal and Cogeneration Project in Guayanilla, Puerto Rico

November 9, 1995.

The staff of the Federal Energy Regulatory Commission (FERC) and the Puerto Rico Planning Board (PRPB) have prepared this joint draft environmental impact statement/preliminary environmental impact statement (DEIS/ PEIS) on the natural gas facilities proposed by EcoEléctrica, L.P. (EcoEléctrica) in the above dockets.

The joint EIS was prepared to satisfy the requirements of the National Environmental Policy Act and Puerto Rico's law requiring an EIS under the Puerto Rico Environmental Quality Board Regulations (Article 4[c] of law No. 9). The FERC and PRPB believe, subject to public comment, that approval of the proposed project, with appropriate mitigation measures including receipt of necessary permits and approvals, would have limited adverse environmental impact. The joint EIS evaluates alternatives to the proposal.

State of Virginia City of Norfolk

to-wit:

**AFFIDAVIT** 

This day Diane Curry personally appeared before me and after being duly sworn made oath that: (1) (He) (She) is affidavit clerk of The Virginian-Pilot a newspaper published by Landmark Communications Inc., in the cities of Norfolk, Portsmouth, Chesapeake, Suffolk, and Virginia Beach, State of Virginia;

(2) That the advertisement hereto annexed at NAVY said newspaper during the following dates: 11/26/95 - 11/28/95

has been published in

Jiane Cum

Affica

Subscribed and swurn to before me in my city and state aforesaid this 4TH day of DECEMBER 1995

My commission expires DECEMBER 31, 1995

Janie J. Obenshain
Notary Public

PUBLIC NOTICE
US DEPARTMENT OF THE NAVY
PUBLIC SCOPING MEETINGS
ENVIRONMENTAL IMPACT STATEMENT (EIS)
TRANSFER OF F/A-18 AIRCRAFT TO
NAVAL AIR STATION (NAS) OCEANA,
VIRGINIA BEACH, VIRGINIA
The Navy will conduct five public scoping meetings to
identify significant issues to be included in an EIS evaluating
the environmental effects of the transfer of 175 F/A-18
aircraft and 3800 associated personnel to NAS Oceana

The Navy will conduct five public scoping meetings to identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of 175 F/A-18 aircraft and 3800 associated personnel to NAS Oceans, pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. This transfer will require approximately 200,000 square feet new construction and modification of existing facilities and will affect the level of aircraft activity at NAS Oceana, Naval Auddispy Landing Field (NALF) Fentress, in Chesapeake, VA and within various aircraft ranges in and adjacent to Virginia and eastern North Carolina. The scoping meetings will be held on: December 5, 1995, 7:00 P.M., at the Carteret County Courthouse, Courthouse Square, US Route 70, Beaufort, NC; December 6, 1995, 7:00 P.M., at the Pamilico County Courthouse, NC Highway 55 (near NC Highway 304), Bayboro, NC; December 7, 1995, 7:00 P.M., at the North Carolina Aquarium and Marine Resources Center, Main Auditorium, Airport Road (adjacent to the Dare County Airport), Manteo, NC; December 12, 1995, 7:00 P.M., at the Seatack Elementary School Main Auditorium, 411 Birdneck Road, Virginia Beach, VA; and December 13, 1995, 7:00 P.M. at the Butts Road Intermediate School Gymaticiaum, 1571 Mount Pleasant Road, Chesapeake, VA., virginiam, 1571 Mount Pleasant Road, Chesapeake, VA., virginiam, 1572 Mount Pleasant Road, Chesapeake, VA., virginiam,

In order to ensure adequate time for those wishing to wrate public comments at the meetings, speakers will be limited to five minutes. Agencies and the public aris also invited and encouraged to provide written comments on the scope of the EIS. Please mall written comments no later than January 5, 1996 to: Commander, Attantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Attn: Code 2032DC (Ng Dan Cecchini), telephone. (804) 322-4891, fax: (804) 322-4894.

# PUBLIC NOTICE US DEPARTMENT OF THE NAVY PUBLIC SCOPING MEETINGS ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR TRANSFER OF F/A-18 AIRCRAFT TO NAVAL AIR STATION (NAS) OCEANA, VIRGINIA BEACH, VIRGINIA

The Navy will conduct five public scoping meetings to identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of approximately 175 F/A-18 aircraft and 3800 associated personnel to NAS Oceana, pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. This transfer will require approximately 200,000 square feet of new construction and modification of existing facilities, and will affect the level of aircraft activity at NAS Oceana, Naval Auxiliary Landing Field (NALF) Fentress, in Chesapeake, VA and within various aircraft training ranges in and adjacent to Virginia and eastern North Carolina. The scoping meetings will be held on: December 5, 7:00 P.M., at the Carteret County Courthouse, Courthouse Square, US Route 70, Beaufort, NC; December 6, 1995, 7:00 P.M. at the Pamlico County Courthouse, NC Highway 55 (near NC Highway 304), Bayboro, NC; December 7, 1995, 7:00 P.M. at the North Carolina Aquarium and Marine Resources Center, Main Auditorium, Airport Road (adjacent to the Dare County Airport), Manteo, NC; December 12, 1995, 7:00 P.M. at the Seatack Elementary School Main Auditorium, 411 Birdneck Road, Virginia Beach, VA; and December 13, 1995, 7:00 P.M. at the Butts Road Intermediate School Gymatorium, 1571 Mount Pleasant Road, Chesapeake, VA.

In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mail written comments no later than January 5, 1996 to: Commander, Attantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Attn: Code 2032DC (Mr. Dan Cechini), telephone: (804) 322-4891, fax: (804) 322-4894.

# Alfidavit of Publication SUN-JOURNAL New Bern, N.C.

of the County of Craven, State of North Carolina,
on this the 5th decor December 1995
of the Sun Journal, Abo, being duly sworn, states that the notice enthied
PUBLIC NOTICE
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a true copy of which is attached hereto. appeared in the Sun Journal, a newspaper published in the City of New Bern, County of Craven, State of North Carolina.
THREE TIMESa week for
ONEweeks, on the following dates:
NOVEMBER 26, 19 95
NOVEMBER 27. 19.95
NOVEMBER 28, 19.95
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19
The New Bern Sun Journal
Subscribed and sworn to this5±h
day of December
Mich Hille Mark
COMMESSION EXPLANA FEB. 20 Motary Public

# PUBLIC NOTICE US DEPARTMENT OF THE NAVY PUBLIC SCOPING MEETINGS ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR TRANSFER OF F/A-18 AIBCRAFT TO NAVAL AIR STATION (NAS) OCEANA, VIRGINIA BEACH, VIRGINIA

The Navy will conduct five public scoping meetings to identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of approximately 175 F/A-18, aircraft and 3800 associated personnel to NAS Oceana, pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. This transfer will require approximately 200,000 square feet of new construction and modification of existing facilities, and will affect the level of aircraft activity at NAS Oceana, Naval Auxiliary Landing Field (NALF) Fentress, in Chesapeake, VA, and within various aircraft training ranges in and adjacent to Virginia and eastern North Carolina. The scoping meetings will be held on: December 5, 7:00 P.M., at the Carteret County Courthouse, Courthouse Square, US Route 70, Beaufort, NC; December 6, 1995 7:00 P.M. at the Pamlico County Courthouse, NC Highway 55 (near NC Highway 304), Bayborn, NC; December 7, 1995, 7:00 P.M/ at the North Carolina Aquarium and Marine Resources Center, Main Auditorium, Airport Road (adjacent to the Dare County Airport), Manteo, NC; December 12, 1995, 7:00 P.M. at the Seatack Elementary School Main Auditorium, 411 Birdneck Road, Virginia Beach, VA; and December 13, 1995, 7:00 P.M./ at the Butts Road Intermediate School Gymatorium, 1571 Mount Pleasant Road, Chesapeake, VA.

In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mail written comments no later than January 5, 1996 to: Commander, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Atm: Code 2032DC (Mr. Dan Cecchini), telephone: (804)322-4891, fax: (804) 322-4894.

Public notice appearing in the *Carteret County News-Times* on November 26, 1995; November 28, 1995; and December 1, 1995.

recording participation in spiritual activities.

ROUTINE USES OF RECORDS MAINTAINED IN THE SYSTEM, INCLUDING CATEGORIES OF USERS AND THE PURPOSES OF SUCH USES:

In addition to those disclosures generally permitted under 5 U.S.C. 553a(b) of the Privacy Act, these records and information contained therein may specifically be disclosed outside DoD as a routine use pursuant to 5 U.S.C. 55a(b)(3) as follows:

The 'Blanket Routine Uses' set forth at the beginning DLA's compilation of systems of records notices do not apply to this system.

POLICIES AND PRACTICES FOR STORING, RETRIEVING, ACCESSING, RETAINING, AND DISPOSING OF RECORDS IN THE SYSTEM:

Records are stored in paper and computerized form.

#### RETRIEVABILITY:

Records are retrieved by name or Social Security Number.

#### SAFEGUARDS:

Records are stored in locked cabinets or rooms and are controlled by personnel screening and computer software.

#### RETENTION AND DISPOSAL:

Information is retained in the system until superseded or no longer needed.

#### SYSTEM MANAGER(S) AND ADDRESS:

Office of the Command Chaplain, Defense Logistics Agency, ATTN: DDAC, 8725 John J. Kingman Road, Suite 2533, Fort Belvoir, VA 22060-6221.

#### **NOTIFICATION PROCEDURES:**

Individuals seeking to determine whether this system of records contains information about themselves should address written inquiries to the Privacy Act Officer, HQ DLA-CAAV, 8725 John J. Kingman Road, Suite 2533, Fort Belvoir, VA 22060-6221.

#### RECORD ACCESS PROCEDURES:

Individuals seeking access to records about themselves contained in this system of records should address written inquiries to the Privacy Act Officer, HQ DLA-CAAV, 8725 John J. Kingman Road, Suite 2533, Fort Belvoir, VA 22060-6221.

#### CONTESTING RECORD PROCEDURES:

The DLA rules for accessing records, and for contesting contents and appealing initial agency determinations are contained in DLA Regulation 5400.21; 32 CFR part 323; or may be obtained from the system manager.

#### RECORD SOURCE CATEGORIES:

Information is provided by the record subject or subject's family members.

#### EXEMPTIONS CLAIMED FOR THE SYSTEM:

[FR Doc. 96-21550 Filed 8-22-96; 8:45 am] BILLING CODE 5000-04-F

#### Department of the Navy

Amended Notice of Intent To Prepare an Environmental Impact Statement and Public Scoping Meeting Notice for Realignment of F/A-18 Aircraft and **Operational Functions From Naval Air** Station, Cecil Field, FL

**SUMMARY:** Pursuant to Section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500–1508). the Department of the Navy announced its intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental consequences of the realignment of F/A-18 aircraft and their associated personnel to Naval Air Station (NAS) Oceana, Virginia Beach, Virginia on November 16, 1995.

In accordance with the 1993 mandates of the Defense Base Closure and Realignment Commission (BRAC 93), the Navy will close NAS Cecil Field, Florida, and realign its F/A-18 and S 3 aircraft, personnel, and other ancillary activities. The 1995 Defense Base Closure and Realignment Commission (BRAC 95) changed the receiving sites for NAS Cecil Field assets to "other naval air stations, primarily NAS Oceana, Virginia; MCAS Beaufort, South Carolina; NAS Jacksonville, Florida; and NAS Atlanta, Georgia; or other Navy or Marine Corps Air Stations with the necessary capacity and support infrastructure." This change was made to support the Navy's operational mission by maximizing the use of existing infrastructure and capacity, eliminating the need for substantial new construction to support the realignment, and maintaining operational flexibility for deployment.

The Navy's November 16, 1995 notice of intent indicated that for BRAC 95, two F/A-18 reserve squadrons are proposed to be transferred to NAS Atlanta for integration with Naval Reserve Forces and would be the subject of separate NEPA documentation. This action has not been revised by this amended notice of intent. The Navy's previous notice of intent also stated that two F/A-18 operational squadrons would be transferred to MCAS Beaufort and be addressed in a separate NEPA

environmental assessment. The remainder of the F/A-18 assets (9 operational squadrons and the Fleet Replacement Squadron [FRS]), were to be transferred to NAS Oceana and be the subject of an EIS.

In recognition of non-specific language contained within the mandates of BRAC 95, the Navy has conducted preliminary planning analysis to determine a range of reasonable alternatives for the basing of F/A-18 operational aircraft. This included identifying east coast air stations with necessary capacity, compatible missions and appropriate facilities to support F/

A-18 operations.

The Navy's preliminary analysis indicated that the following stations have compatible missions, necessary capacity, and could support F/A-18 aircraft: NAS Oceana, Virginia Beach, VA; MCAS Cherry Point, Havelock, NC; and MCAS Beaufort, SC. Based on this preliminary analysis, the Navy is in the process of developing F/A-18 alternative realignment scenarios for inclusion in the EIS.

No preferred alternative for the realignment has been identified by the Navy. Because several reasonable alternatives may be identified for the realignment of F/A-18 operational aircraft, the Navy now plans to prepare one EIS addressing the transfer of all 11 operational squadrons and the FRS from

NAS Cecil Field.

This move includes approximately 200 aircraft, 5000 military personnel, and 200 civilians. In order to accommodate this realignment, depending on the alternative, new/ existing facilities will be constructed or modified at NAS Oceana, MCAS Cherry Point, and/or MCAS Beaufort. In addition, this realignment will result in a greater level of aircraft operations at each of the respective stations and their associated training ranges, depending on the alternative selected.

The Navy intends to analyze the potential impacts of each alternative on the natural environment, including but not limited to air quality, plant and animal habitats, and water resources. such as streams and wetlands. It will also evaluate potential effects to the built environment, including land use patterns, cultural resources, transportation, housing, community services, and the regional economy. Further, the Navy will be preparing analyses of the projected operations of the incoming F/A-18 aircraft on the existing airspace range structure in Virginia, North Carolina, and South Carolina and on aircraft noise exposure levels in and around NAS Oceana, MCAS Cherry Point and MCAS

Beaufort, associated outlying landing fields, and training areas.

ADDRESSES: The Navy has initiated a scoping process for the purpose of determining the scope of significant issues to be addressed in the EIS related to the proposed action. The Navy will hold two additional Public Scoping Meetings on the following dates: September 10, 1996, beginning at 7:00 p.m. at Havelock City Hall, Council Chambers, 1 Hatteras Avenue (at Route 70), Havelock, NC; and on September 11, 1996, beginning at 7:00 p.m. at the Technical College of the Low Country, Learning Resource Center, Main Auditorium, Building 12, 921 Ribaut Road, Beaufort, SC.

In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mail written comments no later than October 5, 1996 to: Commander, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Attn: Code 2032DC (Mr. Dan Cecchini), telephone (757) 322–4891, fax: (757) 322–4859.

D. E. Koenig,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 96-21551 Filed 8-22-96; 8:45 am]
BILLING CODE 3810-FF-P

### DEFENSE NUCLEAR FACILITIES SAFETY BOARD

[Recommendation 96-1]

In-Tank Precipitation System at the Savannah River Site

AGENCY: Defense Nuclear Facilities Safety Board.

ACTION: Notice; recommendation.

SUMMARY: The Defense Nuclear
Facilities Safety Board has made a
recommendation to the Secretary of
Energy pursuant to 42 U.S.C. 2286a
concerning the In-Tank Precipitation
System at the Savannah River Site. The
Board requests public comments on this
recommendation.

DATES: Comments, data, views, or arguments concerning this recommendation are due on September 23, 1996.

ADDRESSES: Send comments, data, views, or arguments concerning this recommendation to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, NW, Suite 700, Washington, DC 20004–2901.

FOR FURTHER INFORMATION CONTACT: Kenneth M. Pusateri or Andrew L. Thibadeau at the address above or telephone (202) 208-6400.

Dated: August 19, 1996.

John T. Conway,

Chairman.

August 14, 1996.

The Defense Nuclear Facilities Safety Board (Board) has devoted substantial attention to the planned use of the InTank Precipitation (ITP) System at the Savannah River Site, because of its importance to removal of high-level radioactive waste from storage tanks at that Site, and because certain unique hazards are associated with the ITP process.

The hazards are a consequence of the volatile and flammable organic compound benzene that is released during the process in amounts that must not exceed safe limits. The benzene is generated through decomposition of tetraphenylborate (TPB) compounds. These compounds are added in the process with the objective to precipitate and remove radioactive cesium from solution in the waste water destined for the saltstone process. The concentrated slurry containing the precipitated cesium constitutes a much smaller volume than the original waste, and its feed to the vitrification process leads to production of a correspondingly smaller amount of glass ultimately to be disposed of in a repository.

The proposed treatment process calls for addition of a quantity of TPB in excess of that theoretically required to precipitate the cesium as cesium TPB. That excess is required partly because the significant amount of potassium present is also precipitated as potassium TPB, and partly because an excess of TPB in solution ensures more effective scrubbing of the radioactive cesium through precipitation. However, the benefit of effective scrubbing is accompanied by the generation of the benzene, which presents hazards of a different sort, and which also requires safety controls.

Westinghouse Savannah River
Company is the Department of Energy
contractor in charge of ITP. The
Westinghouse staff at the Savannah
River Site believed until recently that
the principal cause of decomposition of
TPB and generation of benzene is
exposure of the TPB to the high level of
radiation in the waste. That belief was
based on results of full-scale tests
conducted in 1983 that may have been
misinterpreted, and on a decade of
subsequent bench-scale tests using nonradioactive stimulants (almost

A-9

exclusively) rather than actual waste. The first large-scale operations with actual waste since 1983 were conducted recently in Tank 48, and they showed that the generation and release of benzene did not follow predictions. The generation of benzene in the waste under treatment in Tank 48 was unexpectedly rapid. A surprisingly large amount of the benzene remained captured in the waste, and that benzene was released through action of mixing pumps in the tank.

The current view of the contractor staff is that benzene is produced principally through catalytic decomposition of TPB ions in solution. They believe the catalysts are potentially both soluble and insoluble species, one of which is soluble copper known to be present in the waste. They also believe that the cesium TPB precipitate and the potassium TPB precipitate are relatively immune to catalytic decomposition. The contractor proposes to conduct two Process Verification Tests (PVT), PVT–1 and PVT-2, to further establish the validity of these views and to demonstrate the accuracy of the model it has developed to predict the rate at which the captured benzene is released from solution. PVT-1 would be performed on the homogenized nuclear waste not in Tank 48, which has already been treated with TPB that subsequently has partly decomposed with the result that some cesium has returned to solution. Additional TPB would be added to this material to reprecipitate that cesium. The amount of TPB to be added would be strictly limited to a small amount as needed to reduce the concentration of cesium remaining in solution to a low radiation level acceptable for processing as low level waste in the saltstone process, and a large part of that solution would be sent to saltstone. The subsequent proposed experiment, PVT-2, will involve adding to the slurry remaining in Tank 48 a large amount of additional untreated waste and a substantial quantity of TPB as needed to precipitate the cesium in this new

The Board has been informed that the primary safety precaution for the proposed cesium removal activities is to maintain an inert atmosphere in the headspace of Tank 48. This is to be done through establishing a sufficient flow of nitrogen to the tank. Two nitrogen feed systems are available, a normal system and a supplemental emergency system. The nitrogen systems are present to keep the concentration of oxygen below the level that would support combustion of the benzene. Westinghouse staff members have

# PUBLIC NOTICE US DEPARTMENT OF THE NAVY PUBLIC SCOPING MEETINGS ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR TRANSFER OF F/A-18 AIRCRAFT FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA TO OTHER EAST COAST INSTALLATIONS

The Navy will conduct two public scoping meetings to identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of approximately 200 F/A - 18 operational aircraft and 5200 associated personnel from NAS Cecil Field to other installations, including Marine Corps Air Station (MCAS) Cherry Point, North Carolina, MCAS Beaufort, South Carolina and NAS Oceana, Virginia. This action is being conducted pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. The Navy is formulating alternative realignment scenarios that would involve transferring F/A - 18 aircraft to one or more of these installations. Depending on the alternative, this transfer will require the construction/modification of new/existing facilities and will affect the level of aircraft activity at each installation and within various aircraft training ranges in Virginia, North Carolina, South Carolina, and Georgia. The scoping meetings will be held on: September 10, 1996, beginning at 7:00 p.m. at Havelock City Hall, Council Chambers, 1 Hatteras Avenue (at Route 70), Havelock, NC and on September 11, 1996 beginning at 7:00 p.m. at the Technical College of the Low Country, Main Auditorium, Building 12, 921 Ribaut Road, Beaufort, SC.

In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mail written comments no later than October 5, 1996 to: Commander, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Attn: Code 2032 DC (Mr. Dan Cecchini), fax: (757)322-4894, internet address:cecchijd@efdlant.navfac.navy.mil

Public notice appearing in the New Bern Sun-Journal on September 1, 2, and 3, 1996.

### The Beaufort Gazette

State of South Carolina ( COUNTY OF BEAUFORT	
Personally appeared before me	
Pam V. Jenkins	
of The Beaufort Gazette, a newspaper Beaufort, County and State aforesaid, says that the advertisement of	
US Department of the Navy/Pu ings/Environment Impact Stat	blic Scoping Meet- ement(EIS) for
Transfer of F/A 18 Aircraft	from Naval Air
Station(NAS) Cecil Field, Flo	orida to other
East Coast Installations.  appeared in the issues of said newsp	paper on the following
day(s):September 1, 2, & 3, 1	1996
Subscribed and sworn to  before me this 3rd day  of September /	Oa . V Oa . k.
of September	cam v. flaker
A. D. 19 <u>96</u>	

US DEPARTMENT OF THE NAVY **PUBLIC SCOPING MEETINGS ENVIRONMENTAL IMPACT** STATEMENT (EIS) FOR **TRANSFER** OF F/A-18 AIRCRAFT FROM NAVAL **AIR STATION (NAS)** CECIL FIELD, FLORIDA TO OTHER EAST COAST **INSTALLATIONS** The Navy will conduct two pubic scoping meetings to Identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of approximately 200 F/A-18 operational aircraft and 5200 associated personnel from NAS Cecil Field to othr installations, including Marine Corps Air Station (CMAS) Cherry Point. North Carolina, MCAS Beaufort, South Carolina and NAS Oceana, Virginia. This action is being conducted pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. The Navy is formulating alternative realignment scenarios that would involve transferring F/A-18 aircraft to one. or more of these installations. Depending on the alternative, this transfer will require the construction/ modification of new/existing facilities and will affect the level of aircraft activity at each installation and within various aircraft training ranges in Virginia, North Carolina, South Carolina, and Georgia. The scopthe meetings will be held on: September 10, 1996, beginning at 7:00 p.m. at Havelock City Hall, Council Chambers, 1 Hatteras Avenue (at Route 70), Havelock, NC, and on September 11, 1996, beginning at 7:00 p.m. at the Technical College of the Low Country, Main Auditorium, Building 12, 921 Ribaut Road, Beaufort, SC. In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mail written comments no later than October 5, 1996 to: Commander, Atlantic Division, Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511, Attn: Code 2032DC (Mr. Dan Cecchini), fax: (757)322-4894, internet address:cecchijd@efdlant.navfac.navv.mil

**PUBLIC NOTICE** 

NOTARY PUBLIC

CARTERET COUNTY, NORTH CAROLINA.

AFFIDAVIT OF PUBLICATION				
Before the undersigned, a Notary Public of said County and State, duly commissioned, qualified, and authorized by law to administer oaths,				
personally appeared				
Patti J. Lyerly who being				
first duly sworn, deposes and says: that he (she) is				
(Owner, partner, publisher, or other officer or employee authorized to make this affidavit) of THE CARTERET PUBLISHING CO., INC., engaged in the publication of a newspaper known as CARTERET COUNTY NEWS-TIMES, published, issued, and entered as second class mail in the Town of Morehead City, in said County and State; that he (she) is authorized to make this affidavit and sworn statement; that the notice or other legal advertisement, a true copy of which is attached hereto, was published in CARTERET COUNTY				
NEWS-TIMES on the following dates:				
September 1, 4, 6, 1996				
and that the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina.				
This 9th day of September 1996				
(Signature of person making affidavit)				
Sworn to and subscribed before me, this				
September 96				
Rosa E. Harner				

My Commission expires: July 16, 2001

# U.S. DEPARTMENT OF THE NAVY PUBLIC SCOPING MEETINGS ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR TRANSFER OF F/A-18 AIRCRAFT FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA TO OTHER EAST COAST INSTALLATIONS

The Navy will conduct two public scoping meetings to identify significant issues to be included in an EIS evaluating the environmental effects of the transfer of approximately 200 F/A-18 operational aircraft and 5,200 associated personnel form NAS Cecil Field to other installations, including Marine Corps Air Station (MCAS) Cherry Point, North Carolina, MCAS Beaufort, South Carolina and NAS Oceana, Virginia. This action is being conducted pursuant to the 1995 recommendations of the Defense Base Closure and Realignment Commission. The Navy is formulating alternative realignment scenarios that would involve transferring F/A-18 aircraft to one or more of these installations. Depending on the alternative, this transfer will require the construction/modification of new/existing facilities and will affect the level of aircraft activity at each installation and within various aircraft training ranges in Virginia Carolina, South Carolina and Georgia. The scoping meetings will be held on: Selection 10, 1996, beginning at 7:00 p.m. at Havelock City Hall, Council Chambers, 1 Hatteras Avenue (at Route 70), Havelock, N.C., and on September 11, 1996, beginning at 7:00 p.m. at the Technical College of the Low Country, Main Auditorium, Building 12, 921 Ribaut Road, Beaufort, S.C.

In order to ensure adequate time for those wishing to make public comments at the meetings, speakers will be limited to five minutes. Agencies and the public are also invited and encouraged to provide written comments on the scope of the EIS. Please mall written comments no later than October 5, 1996 to: Commander, Atlantic Division. Naval Facilities Engineering Command, 1510 Gilbert Street, Norfolk, Virginia 23511. Attn: Code 2032DC (Mr. Dan Cecchini), fax: (757)322-4894, internet address: cacchijd@efdlant.navfac.navy.mil

Notary Public.

confirm, approve, and place into effect on a final basis, to remand, or to disapprove such rates to the FERC. Existing DOE procedures for public participation in power rate adjustments are found at 10 CFR part 903.

#### Regulatory Flexibility Analysis

Pursuant to the Regulatory Flexibility Act of 1980 (5 U.S.C. 601, et seq.), each agency, when required to publish a proposed rule, is further required to prepare and make available for public comment an initial regulatory flexibility analysis to describe the impact of the proposed rule on small entities. In this instance the initiation of the LAP transmission rate and ancillary service rate adjustments are related to nonregulatory services provided by Western at particular rates. Under 5 U.S.C. 601(2), rules of particular applicability relating to rates or services are not considered rules within the meaning of the act. Since the LAP transmission rates and ancillary services are of limited applicability, no flexibility analysis is required.

#### Environmental Compliance

Western will conduct an environmental evaluation of the proposed rates and develop the appropriate level of environmental documentation pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.); the Council on Environmental Quality Regulations for implementing NEPA (40 CFR parts 1500 through 1508); and the DOE NEPA Implementing Procedures and Guidelines (10 CFR part 1021).

#### Determination Under Executive Order 12866

DOE has determined that this is not a significant regulatory action because it does not meet the criteria of Executive Order 12866, 58 FR 51735. Western has an exemption from centralized regulatory review under Executive Order 12866; accordingly, no clearance of this notice by Office of Management and Budget is required.

#### Availability of Information

All brochures, studies, comments, letters, memoranda, or other documents made or kept by Western for developing the proposed rates, will be made available for inspection and copying at the RMR Office, located at 5555 East Crossroads Boulevard, Loveland, Colorado, 80537, during normal business hours.

Dated: Sepember 11, 1997.

Michael S. Hacskaylo,

Acting Administrator.

[FR Doc. 97-24950 Filed 9-18-97; 8:45 am]

### ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-5484-4]

### **Environmental Impact Statements; Notice of Availability**

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 OR (202) 564–7153. Weekly receipt of Environmental Impact Statements Filed September 08, 1997 Through September 12, 1997 Pursuant to 40 CFR 1506.9.

EIS No. 970357, Draft EIS, FHW, WV, Elkins Bypass Project, Relocation of US-33 between Aggregates and Canfield, Constructions, Funding NPDES Permit and COE Section 404 Permit, Randolph County, WV, Due: November 20, 1997, Contact: David A. Leighow (304) 347-5268.

EIS No. 970358, Final Supplement,
AFS, ID, Katka Peak Timber Sale and
Road Construction, Implementation,
New Information from Interior
Columbia Basin Ecosystem
Management Project, to implement
Ecosystem Restoration Treatment,
Bonners Ferry Ranger District, Idaho
Panhandle National Forests,
Boundary County, ID, Due: October
20, 1997, Contact: Barry Wynsma
(208) 262-5561.

EIS No. 970359, Final EIS, BLM, WY, Greybull Valley Irrigation District Dam and Reservoir Project, Issuance of Right-of-Way Permit and COE Section 404 Permit, Park County, WY, Due: October 20, 1997, Contact: Don Ogaard (307) 347-5160.

VA, NC, Cecil Field Naval Air Station, Realignment of F/A-18 Aircraft and Operational Functions, to Other East Coast Installations; NAS Oceana, VA; MCAS Beaufort, SC and MCAS Cherry Point, NC, Implementation, COE Section 404 Permit, FL, SC, NC and VA, Due: November 18, 1997, Contact: J. Daniel Cecchini (757) 322-4891.

EIS No. 970361, Final EIS, FRC, MA, NH, VT, ME, Portland Natural Gas Transmission System Project (PNGTS) and (PNGTS)/Maritimes & Northeast Pipeline L.L.C., Phase II Joint Facilities Project, Construction and Operation, COE Section 10 and 404 Permits, MA, York and Cumberland Counties, ME, Coos County, NH and Essex County, VT, Due: October 20,

1997, Contact: Paul McKee (202) 208–1088.

EIS No. 970362, Final EIS, GSA, CO, Denver Federal Center Master Site Plan, Implementation, City of Lakewood, Jefferson County, CO, Due: October 24, 1997, Contact: Lisa Morpurgo (303) 236–7231 ext 250.

EIS No. 970363, Final EIS, FRC, WA, Nooksack River Basin Hydroelectric Projects, Seven Projects—(FERC No. 4628) (FERC No. 4738) (FERC No. 4270) (FERC No. 4282) (FERC No. 9231) (FERC No. 4312) and (FERC No. 3721) Construction and Operation, Licensing, Whatcom County, WA, Due: October 20, 1997, Contact: Tom Dean (202) 219–2778.

EIS No. 970364, Draft EIS, SFW, MN, IA, Northern Tallgrass Prairie Habitat Preservation Area (HPA), Preserve, Restore and Manage, several counties, MN and several counties, IA, Due: November 06, 1997, Contact: Jane West (612) 725–3306.

#### **Amended Notices**

EIS No. 970247, Draft EIS, SFW, ID, MT, Grizzly Bear (Ursus arctos horribilus) Recovery Plan in the Bitterroot Ecosystem, Implementation, Endangered Species Act, Proposed Special Rule 10(j) Establishment of a Nonessential Experimental Population of Grizzly Bears in the Bitterroot Area, Rocky Mountain, Blaine, Camas, Boise, Clearwater, Custer, Elmore, Idaho, Lemhi, Shoshone, Due: November 03, 1997, Contact: Dr. Christopher Servheen (406) 243–4903. Published FR 07–11–97—Review Period Extended.

EIS No. 970266, Draft EIS, BLM, CA, Fourmile Hill Geothermal Development Project, Construction,
Operation and Maintenance, 49.9 megawatt (MW) Geothermal Power Plant, Federal Geothermal Leases CA–21924 and CA–21926, Glass Mountain Known Geothermal Resource Area, Klamath and Modoc National Forests, Siskiyou and Modoc Counties, CA, Due: September 30, 1997, Contact: Randall Sharp (916) 233–5811. Published FR 07–11–97—Review Period extended.

EIS No. 970356, Final EIS, FHW, VA, DC, MD, Woodrow Wilson Bridge Improvement, I-95 from the Telegraph Road/Capital Beltway Interchange in Alexandria, VA to the MD-210/Capital Beltway Interchange in Oxon Hill, MD, Funding, Section 10 and 404 Permits and CGD Bridge Permit, Fairfax County, VA; Prince George's County, MD, and DC, Due: October 20, 1997, Contact: David C. Lawton (410) 962-0077. Published

Engineers (Corps), the Glenn-Colusa Irrigation District (GCID), and the California Department of Fish and Game (CDFG) propose to construct the Hamilton City Pumping Plant Fish Improvement Screen Project. The project is in response to concerns over impacts to salmon and other fish species from water diversion operations at the Hamilton City Pumping Plant. Two public workshops to present material on the alternatives and to answer questions and a public hearing to receive comments from interested organizations and individuals on the environmental impacts of the project will be held.

DATES: Public comments on the DEIR/ DEIS should be submitted on or before November 17, 1997. The public workshops will be held at the following locations:

- November 4, 1997, 1:00 p.m., Granzella's Inn, 391 6th Street, Williams, California
- November 4, 1997, 7:00 p.m.,
   Hamilton High School, Highway 32 and
   Canal Street, Hamilton City, California

ADDRESSES: Requests for copies of the DEIR/DEIS and comments on the DEIR/DEIS should be submitted to the Fish Screen Improvement Project, Draft EIR/EIS Comments, 455 Capitol Mall, Suite 600, Sacramento, California 95814, Attention: Rick Lind; telephone (916) 325—4050.

Copies of the DEIR/DEIS are also available for public inspection and review at the following locations:

- 1. Bureau of Reclamation, Room E-1704, 2800 Cottage Way, Sacramento, CA 95825-1898; (916) 979-5100.
- 2. Bureau of Reclamation, Northern California Area Office, Attention: NCAO-320, 16349 Shasta Dam Blvd, Shasta Lake, CA 96019-8400; (916) 275-1554.
- 3. Surface Water Resources, Inc., 455 Capitol Mall, Suite 600, Sacramento, CA 95814; (916) 325-4050.
- 4. Bureau of Reclamation, Willows Construction Office, Attention: W-200, 1140 West Wood Street, Willows, CA 95988-0988; (916) 934-7066.
- 5. Natural Resources Library, U.S. Department of the Interior, 1849 C Street NW, Main Interior Building, Washington DC 20240-0001.
- 6. Library, Bureau of Reclamation, 6th Avenue and Kipling, Room 167, Building 67, Denver Federal Center, Denver, CO 80225–0007.
- 7. University of California-Berkeley, Water Resources Center Archives, 410 O'Brien Hall, Berkeley, CA 94720–1718.
- 8. California State University-Chico, Government Publications Center, Meriam Library, Chico, CA 95929–0295.

- 9. Butte County Library, Publications, 1820 Mitchell Ave, Oroville, CA 95966– 5333
- 10. Shasta County Public Library, Redding Main Branch, 1855 Shasta Street, Redding, CA 96001–0418.
- 11. U.S. Army Corps of Engineers, 1325 J Street, Sacramento, CA 95814. FOR FURTHER INFORMATION CONTACT: For additional information, please contact Ms. Lauren Carly, Reclamation, (916) 934–7066; Mr. Matt Davis, Corps, (916) 557–6708; Ms. Sandra Dunn, GCID, (916) 446–7979; or Mr. Nick Villa, CDFG, (916) 358–2943.

#### SUPPLEMENTARY INFORMATION:

Reclamation, the Corps, GCID and CDFG have prepared the DEIR/DEIS to analyzes the no-action alternative as well as three action alternatives. The action alternatives would minimize loss of all fish species in the vicinity of the pumping plant diversion while maximizing GCID's capability to divert the full quantity of water it is entitled to divert to meet its water supply delivery obligations. The agency preferred alternative would include an extension of the existing fish screen, internal fish bypasses, improvements to the intake and bypass channel, and a gradient facility.

Dated: September 26, 1997.

Kirk C. Rodgers,

Deputy Regional Director.

Dated: September 25, 1997.

Brandon C. Muncy,

Major, Deputy District Engineer—Civil Works. [FR Doc. 97-26295 Filed 10-2-97; 8:45 am] BILLING CODE 4310-94-P

#### DEPARTMENT OF DEFENSE

#### Department of the Navy

Notice of Public Hearings for a Draft Clean Air Act Conformity Determination and Draft Environmental Impact Statement for Realignment of F/ A-18 Aircraft and Operational Functions From Naval Air Station Cecil Field, Florida to Other East Coast Installations

SUMMARY: Pursuant to Section 102(2) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500–1508), and the Clean Air Act, General Conformity Rule (40 CFR Part 93), the Department of the Navy has prepared and filed with the U.S. Environmental Protection Agency a Draft Environmental Impact Statement (DEIS) and Draft Clean Air Act Conformity Determination to evaluate the realignment of F/A-18 aircraft and operational functions from Naval Air Station (NAS) Cecil Field, Florida to other Navy and Marine Corps air stations on the east coast of the United States. In accordance with these laws and regulations, this notice announces the dates and locations of public hearings.

The realignment of F/A-18 aircraft and associated functions from NAS Cecil Field is mandated by the Defense Base Closure and Realignment Act (Pub. L. 101-510, title XXIX) in accordance with the Congressionally approved recommendation of the 1995 Defense Base Closure and Realignment Commission. The DEIS considers five alternatives for realignment of 11 F/A-18 fleet squadrons (132 aircraft) and the fleet replacement squadron (FRS) (48 aircraft).

East coast installations that meet operational criteria and are considered as possible receiving sites for F/A-18 aircraft includes NAS Oceana, Virginia; Marine Corps Air Station (MCAS) Beaufort, South Carolina; and MCAS Cherry Point, North Carolina. The preferred alternative is to single-site the F/A-18 aircraft at NAS Oceana, which has the largest capacity to accommodate the aircraft. Other alternatives that separate the F/A-18 aircraft between two of the bases are considered. The level of new construction required at each base to accommodate the aircraft is related to the number of aircraft to be transferred under each alternative. Each alternative is assessed in the DEIS with regard to its effects on the natural and built environments.

The DEIS has been distributed to various Federal, state, and local agencies, as well as other interested individuals and organizations. In addition, copies of the DEIS have been distributed to the following libraries for public review: Virginia Beach Central Library, 4100 Virginia Beach Boulevard. Virginia Beach, Virginia; Great Neck Library, 1251 Bayne Drive, Virginia Beach, Virginia; Chesapeake Central Library, 298 Cedar Road, Chesapeake, Virginia; Craven County Library, 300 Miller Boulevard, Havelock, North Carolina; Beaufort County Library, 311 Scott Street, Beaufort, South Carolina; Dare County Library, 700 North U.S. 64/ 264, Manteo, North Carolina; Pamlico County Library, 603 Main Street, Bayboro, North Carolina; Ida Hilton Library, 1105 North Way, Darien, Georgia. A limited number of single copies of the DEIS and Draft CAA Conformity Determination are available upon request by contacting Mr. Dan Cecchini at (757) 322-4891.

ADDRESSES: Public hearings will be held during the month of October for those individuals who would like to provide oral comments on the DEIS or the Draft CAA Conformity Determination. An open information session will precede the scheduled public hearing at each of the locations listed below and will allow individuals to review the data presented in the DEIS. Navy representatives will be available during the information session to answer questions and/or clarify information related to the DEIS. The open information session is scheduled from 3:30 p.m. to 7:00 p.m., followed by the public hearing from 7:30 p.m. to 10:00 p.m. Public hearings have been scheduled at the following times and locations: Monday, October 20, 1997, Technical College of the Low Country, Building 12, Main Auditorium, 921 Ribaut Road, Beaufort, South Carolina; Tuesday, October 21, 1997, Havelock Middle School, 102 High School Drive, Havelock, North Carolina; Wednesday, October 22, 1997, Pamlico County Courthouse, 202 Main Street, Bayboro, North Carolina; Thursday, October 23, 1997, North Carolina Aquarium on Roanoke Island, Airport Road, Manteo, North Carolina; Monday, October 27, 1997, Virginia Beach Pavilion Convention Center Auditorium, 1000 19th Street, Virginia Beach, Virginia; Tuesday, October 28, 1997, Butts Road Intermediate School, 1571 Mt. Pleasant Road, Chesapeake, Virginia.

Federal, state and local agencies and interested parties are invited and urged to be present or represented at the hearing. Oral statements will be heard and transcribed by a stenographer; however, to ensure the accuracy of the record, all statements should be submitted in writing. All statements, both oral and written, will become part of the public record on the DEIS and Draft CAA Conformity Determination and will be responded to in the Final Environmental Impact Statement (FEIS). Equal weight will be given to both oral and written statements.

In the interest of available time and to ensure all who wish to give an oral statement have the opportunity to do so, each speaker will be asked to limit comments to three (3) minutes. If a longer statement is to be presented, it should be summarized at the public hearing and submitted in writing either at the hearing or mailed or faxed to Mr. Dan Cecchini at: Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. J. Dan Cecchini (Code 2032DC), 1510 Gilbert Street, Norfolk, Virginia 23511; Fax: (757) 322-4894. All written comments postmarked by November 18, 1997, will become a

part of the official public record and will be responded to in the FEIS.

FOR FURTHER INFORMATION CONTACT:
Additional information concerning this notice may be obtained by contacting Mr. Cecchini or one of the following individuals: Mr. Fred Pierson,
Community Planning Liaison Officer,
NAS Oceana, (757) 433–3158; LtCol
Blackiston, Community Planning
Liaison Officer, MCAS Cherry Point,
(919) 466–4196; LtCol Keverline,
Community Planning Liaison Officer,
MCAS Beaufort, (803) 522–7390, or Capt
Mason, Public Affairs Officer, MCAS
Beaufort, (803) 522–7201.

Dated: September 29, 1997.

Darse E. Crandall,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 97-26211 Filed 10-2-97; 8:45 am]

#### **DEPARTMENT OF EDUCATION**

### Advisory Council on Education Statistics, (ACES)

**AGENCY:** Department of Education. **ACTION:** Notice of partially closed meetings.

SUMMARY: This notice sets forth the schedule and proposed agenda of the forthcoming meetings of the Advisory Council on Education Statistics (ACES). Notice of these meetings are required under Section 10(a)(2) of the Federal Advisory Committee Act. This document is intended to notify the general public of their opportunity to attend.

DATES: October 9-10, 1997.

TIMES: October 9, 1997—Full Council, 8:30 a.m.-11:30 a.m., (open); 11:30 to 1:15 p.m., (closed); Management Committee, 1:30 p.m.-5:00 p.m., (open); Statistics Committee, 1:30 p.m.-5:00 p.m. (open), Strategy/Policy 1:30 p.m.-5:00 p.m. (open), October 10, 1997—Full Council 12 noon to 3:00 p.m. (open); Statistics Committee, 8:30 a.m.-12:00 noon (open); Strategy/Policy Committee, 8:30 a.m. to 12 noon (closed); and Management Committee, 8:30 a.m. to 12:00 noon (open).

LOCATION: The Phoenix Park Hotel, 520 North Capitol Street, NW., Washington, DC 20001.

FOR FURTHER INFORMATION CONTACT: Barbara Marenus, National Center for Education Statistics, 555 New Jersey Ave. NW., Room 400j, Washington, DC

20208-5530. Telephone (202) 219-1828.

SUPPLEMENTARY INFORMATION: The Advisory Council on Education

Statistics (ACES) is established under Section 406(c)(1) of the Education Amendments of 1974, Public Law 93-380. The Council is established to review general policies for the operation of the National Center for Education Statistics (NCES) in the Office of Educational Research and Improvement and is responsible for advising on standards to insure that statistics and analyses disseminated by NCES are of high quality and are not subject to political influence. In addition, ACES is required to advise the Commissioner of NCES and the National Assessment Governing Board on technical and statistical matters related to the National Assessment of Education Progress (NAEP). The meetings of the Council are open to the public.

The proposed agenda for the full Council includes the following:

- A status report from the NCES Commissioner on major Center initiatives;
- New member swearing -in;
- The presentation of Committee reports;
- A discussion on the development of an NCES periodical;
- A discussion of strategic issues in technology facing NCES; and
- A status report on the NAEP redesign and the development of a new request for proposal (RFP) for NAEP.

Since the full Council's discussion on the implementation of the NAEP redesign includes reporting on plans for an upcoming procurement, this session must be closed to the public. The premature release of this information would result in the disclosure of information that would be likely to significantly frustrate implementation of the agency's proposed action. Such matters are protected by exemption (9)(B) of Section 552b (c) of title 5 U.S.C.

Individual meetings of the three ACES subcommittees will focus on specific topics:

• The agenda for the Management Committee includes discussion on the results from the 1996 Customer Service Survey and plans for the 1997 survey, plans for the development of partnerships with external organizations, and a discussion of "capacity building" activities for NCES.

• The agenda for the Statistics Committee focuses on the development of a research agenda on the NAEP achievement level setting process.

 The agenda for the Strategy/Policy Committee includes discussion of NCES procurement initiatives for 1999 and beyond, a new NCES database for budgeting and planning, and a discussion of design options for the redesign of the Schools and Staffing affected Federal, state, and local agencies, and other organizations and entities to participate in this study.

8. A public scoping workshop will be held on 6 November 1997 from 7–9 p.m. at Largo High School in Upper Marlboro, Maryland. The purpose of the meeting is to solicit public concerns and comments on the study area and the study process.

9. The DEIS is tentatively scheduled to be available for public review in July of 1999.

#### Gregory D. Showalter,

Army Federal Register Liaison Officer.
[FR Doc. 97-28878 Filed 10-30-97; 8:45 am]
BILLING CODE 3710-41-M

#### **DEPARTMENT OF DEFENSE**

#### Department of the Navy

Notice of an Additional Public Hearing In Manteo, NC for the Draft Environmental Impact Statement (DEIS) for Realignment of F/A-18 Aircraft and Operational Functions from Naval Air Station (NAS) Cecil Field, Florida to Other East Coast Installations

SUMMARY: Pursuant to Section 102(2) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR 1500-1508), the Department of the Navy has prepared and filed with the U.S. Environmental Protection Agency a Draft Environmental Impact Statement (DEIS) to evaluate the realignment of F/A-18 aircraft and operational functions from Naval Air Station (NAS) Cecil Field, Florida to other Navy and Marine Corps air stations on the east coast of the United States. In accordance with these laws and regulations, this notice announces the date and location of an additional public hearing for the DEIS. A public hearing has been scheduled for Monday, November 17, 1997, at the North Carolina Aquarium on Roanoke Island, Airport Road, Manteo, North Carolina to provide information and to receive public input on the DEIS for the realignment of F/A-18 aircraft and associated functions from NAS Cecil Field, Florida to east coast installations. On October 23, 1997, the Department of the Navy conducted a public hearing at the North Carolina Aquarium in Manteo. Notice of this public hearing was made in the Federal Register on October 3, 1997. However, subsequent to the October 23 hearing, the Navy received information that indicated that the notice of the public hearing was not well publicized in the primary local

newspaper serving the Manteo/Dare County area (The Virginian-Pilot, North Carolina edition). Therefore, the Department of the Navy has decided to conduct an additional public hearing at the North Carolina Aquarium on Monday, November 17, 1997, to ensure the public has an opportunity to obtain information and provide comment on the DEIS. An open information session, which will precede the scheduled public hearing will allow individuals to review the data presented in the DEIS. Navy representatives will be available during the information session to answer questions and/or clarify information related to the DEIS. The open information session is scheduled from 5:00 p.m. to 7:00 p.m., followed by the public hearing, which will begin at 7:30 p.m.

Navy will conduct the public hearing. Federal, state and local agencies and interested parties are invited and urged to be present or represented at the hearing. Oral statements will be heard and transcribed by a stenographer; however, to ensure the accuracy of the record, all statements should be submitted in writing. All statements, both oral and written, will become part of the public record on the DEIS and will be responded to in the Final Environmental Impact Statement (FEIS). Equal weight will be given to both oral and written statements.

In the interest of available time and to ensure all that wish to give an oral statement have the opportunity to do so, each speaker will be asked to limit comments to three (3) minutes. If longer statements are to be presented, they should be summarized at the public hearing and submitted in writing either at the hearing or mailed or faxed to Mr. Dan Cecchini at: Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. J. Dan Cecchini (Code 2032DC), 1510 Gilbert Street, Norfolk, Virginia 23511; Fax: (757) 322–4894.

ADDRESSES: The DEIS has been distributed to various Federal, state, and local agencies, as well as other interested individuals and organizations. In addition, copies of the DEIS have been distributed to the following libraries for public review: Virginia Beach Central Library, 4100 Virginia Beach Boulevard, Virginia Beach, Virginia; Great Neck Library, 1251 Bayne Drive, Virginia Beach, Virginia; Chesapeake Central Library, 298 Cedar Road, Chesapeake, Virginia; Craven County Library, 300 Miller Boulevard, Havelock, North Carolina; Beaufort County Library, 311 Scott Street, Beaufort, South Carolina; Dare

County Library, 700 North U.S. 64/264, Manteo, North Carolina; Pamlico County Library, 603 Main Street. Bayboro, North Carolina; Ida Hilton Library, 1105 North Way, Darien, Georgia. A limited number of single copies are available upon request by contacting Mr. J. Dan Cecchini at (757) 322–4891.

POINT OF CONTACT: Additional information concerning this notice may be obtained by contacting Mr. Cecchini at (757) 322–4891.

Dated: October 29, 1997.

#### Darse E. Crandall,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 97-29033 Filed 10-30-97; 8:45 am]
BILLING CODE 3810-FF-N

#### **DEPARTMENT OF DEFENSE**

#### Department of the Navy

Notice of the Board of Advisors to the President, Naval War College, Open Meeting

SUMMARY: Pursuant to the provisions of the Federal Advisory Committee Act (5 U.S.C. App. 2), notice is given that the Board of Advisors to the President, Naval War College, will meet from 0830–1700 on November 21, 1997 in Conolly Hall, Naval War College, 686 Cushing Road, Newport, Rhode Island. The meeting will be open to the public.

The purpose of the meeting is to elicit the advice of the Board on educational, doctrinal and research policies and programs. The agenda will consist of presentations and discussions on the curriculum, programs and plans of the college since the last meeting of the Board on May 29 and 30, 1996. Naval War College.

FOR FURTHER INFORMATION CONTACT: Mrs. Mary E. Estabrooks, Assistant to the Dean of Academics, Naval War College, 686 Cushing Road, Newport, RI 02841–1207. Telephone number (401) 841–3589.

Dated: October 21, 1997.

#### Darse E. Crandall,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 97–28868 Filed 10–30–97; 8:45 am] BILLING CODE 3810-FF-P



# NOTICE OF AVAILABILITY AND PUBLIC HEARINGS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR REALIGNMENT OF F/A-18 AIRCRAFT AND OPERATIONAL FUNCTIONS FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA, TO OTHER EAST COAST INSTALLATIONS, AND DRAFT CLEAN AIR ACT (CAA) CONFORMITY DETERMINATION

The Navy has completed a DEIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations, in compliance with the National Environmental Policy Act, and a Draft CAA Conformity Determination in compliance with the CAA General Conformity Rule.

These documents are available for public review and comment.

The realignment of 180 F/A-18 aircraft and associated functions from NAS Cecil Field is mandated by the Defense Base Closure and Realignment Act (P.L. 101-510, Title XXIX). East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; Marine Corps Air Station (MCAS) Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

This DEIS/Draft CAA Conformity Determination has been distributed to the U.S. Environmental Protection Agency; members of Congress; state governors and representatives; key federal, state, and local agencies; and private citizens. Single copies are available upon request by contacting Mr. Dan Cecchini at (757) 322-4891. Copies of the DEIS/Draft CAA Conformity Determination are also available for review at the following location in South Carolina:

#### **Beaufort County Library**

311 Scott Street

Beaufort, South Carolina

Comments on the DEIS and Draft CAA Conformity Determination should be mailed to Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. Dan Cecchini (Code 2032 DC), 1510 Gilbert Street, Norfolk, Virginia 23511. Comments may also be faxed to Mr. Cecchini at (757) 322-4894.

A public hearing will be held in October for those individuals who would like to provide verbal or written comments on the DEIS or the Draft CAA Conformity Determination. An open information session, which will precede the scheduled public hearing, will allow individuals to review the data presented in the DEIS. The hearing has been scheduled at the following location in South Carolina:

#### Technical College of the Low Country

Building 12, Main Auditorium

921 Ribaut Road

Beaufort, South Carolina

Monday, October 20, 1997

Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final Environmental Impact Statement (FEIS) for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.

Any general questions or requests for clarification on the DEIS or public hearing/public comment schedule or procedures should be directed to Lt. Col. Keveline, Community Plans and Liaison Officer, MCAS Beaufort, (803) 522-7390, or Capt. Mason, Public Affairs Officer, MCAS Beaufort, (803) 522-7201.

Public notice appearing in *The Beaufort Gazette* on September 20, 21, and 22, 1997; and the *Tri–Command Tribune* on September 26, 1997.

02: OV8903\_D5321\NOTICES.P65(p3)

South Carolina

# WE WANT YOUR INPUT ON THE F/A-18 DEIS!!

The Navy has completed a draft environmental impact statement (DEIS) for realignment of F/A-18 aircraft and operational functions from NAS Cecil Field, Florida, to other east coast installations and is seeking your comments. East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; MCAS Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

#### For information and to provide your comments, please plan to attend:

October 20, 1997
Technical College of the Low Country
Building 12, Main Auditorium
821 Ribaut Road
Beaufort, South Carolina
3:30-7:00 pm, Information Session
7:30-10:00 pm, Public Hearing

#### To review the DEIS, copies are available at:

Beaufort County Library 311 Scott Street Beaufort, South Carolina

#### To mail in comments:

Commander, Atlantic Division Naval Facilities Engineering Command Attn: Mr. Dan Cecchini (Code 2032 DC) 1510 Gilbert St. Norfolk, Virginia 23511 Facsimile: (757) 322-4894

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final EIS for Realignment of FIA-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.



Public notice appearing in *The Beaufort Gazette* on October 11, 15, and 19, 1997; and the *Tri-Command Tribune* on October 17, 1997.

South Carolina

02: OV8903\_D5321\Publicmtgnotices.P65 (p2)



# NOTICE OF AVAILABILITY AND PUBLIC HEARINGS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR REALIGNMENT OF F/A-18 AIRCRAFT AND OPERATIONAL FUNCTIONS FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA, TO OTHER EAST COAST INSTALLATIONS, AND DRAFT CLEAN AIR ACT (CAA) CONFORMITY DETERMINATION

The Navy has completed a DEIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations, in compliance with the National Environmental Policy Act, and a Draft CAA Conformity Determination in compliance with the CAA General Conformity Rule.

These documents are available for public review and comment.

The realignment of 180 F/A-18 aircraft and associated functions from NAS Cecil Field is mandated by the Defense Base Closure and Realignment Act (P.L. 101-510, Title XXIX). East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; Marine Corps Air Station (MCAS) Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

This DEIS/Draft CAA Conformity Determination has been distributed to the U.S. Environmental Protection Agency; members of Congress; state governors and representatives; key federal, state, and local agencies; and private citizens. Single copies are available upon request by contacting Mr. Dan Cecchini at (757) 322-4891. Copies of the DEIS/Draft CAA Conformity Determination are also available for review at the following location in North Carolina:

Craven County Library 300 Miller Boulevard Havelock, North Carolina Pamlico County Library 603 Main Street

Bayboro, North Carolina

Dare County Library 700 North U.S. 64/264 Manteo, North Carolina

Comments on the DEIS and Draft CAA Conformity Determination should be mailed to Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. Dan Cecchini (Code 2032 DC), 1510 Gilbert Street, Norfolk, Virginia 23511. Comments may also be faxed to Mr. Cecchini at (757) 322-4894.

Public hearings will be held in October for those individuals who would like to provide verbal or written comments on the DEIS or the Draft CAA Conformity Determination. Open information sessions, which will precede each of the scheduled public hearings, will allow individuals to review the data presented in the DEIS. Hearings have been scheduled at the following locations in North Carolina:

Havelock Middle School 102 High School Drive Havelock, North Carolina Tuesday, October 21, 1997 Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm

Pamlico County Courthouse 202 Main Street Bayboro, North Carolina Wednesday, October 22, 1997 Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm North Carolina Aquarium on Roanoke Island Airport Road Manteo, North Carolina Thursday, October 23, 1997 Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final Environmental Impact Statement (FEIS) for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.

Any general questions or requests for clarification on the DEIS or public hearing/public comment schedule or procedures should be directed to Lt. Col. Blackiston, Community Plans and Liaison Officer, MCAS Cherry Point (919) 466-4196.

Public notice appearing in the New Bern Sun-Journal on September 20, 21, and 22, 1997.

02: OV8903\_D5321\NOTICES.P65(p2)

North Carolina

## **WE WANT YOUR INPUT ON THE F/A-18 DEIS!!**

The Navy has completed a draft environmental impact statement (DEIS) for realignment of F/A-18 aircraft and operational functions from NAS Cecil Field, Florida, to other east coast installations and is seeking your comments. East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; MCAS Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

#### For information and to provide your comments, please plan to attend:

October 21, 1997 **Havelock Middle School** 

102 High School Dr. Havelock, NC

October 22, 1997 **Pamlico County** Courthouse 202 Main St. Bayboro, NC

All meetings: 3:30-7:00 pm. Information Session 7:30-10:00 pm, Public Hearing

October 23, 1997 North Carolina Aguarium on Roanoke Island Airport Rd. Manteo, NC

#### To review the DEIS, copies are available at:

**Craven County Library** 300 Miller Blvd. Havelock, NC

**Pamlico County Public Library** 603 Main St. Bayboro, NC

Dare County Library 700 North U.S. 64/264 Manteo, NC

#### To mail in comments:

Commander, Atlantic Division **Naval Facilities Engineering Command** Attn: Mr. Dan Cecchini (Code 2032 DC) 1510 Gilbert St.

Norfolk, Virginia 23511 Facsimile: (757) 322-4894

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final EIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.



Public notice appearing in the New Bern Sun-Journal on October 11, 15, and 19, 1997.

North Carolina

02: OV8903\_D5321\Publicmtgnotices.P65 (p5)



#### NOTICE OF AVAILABILITY AND PUBLIC HEARINGS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR REALIGNMENT OF F/A-18 AIRCRAFT AND OPERATIONAL FUNCTIONS FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA, TO OTHER EAST COAST INSTALLATIONS, AND DRAFT CLEAN AIR ACT (CAA) CONFORMITY DETERMINATION

The Navy has completed a DEIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations, in compliance with the National Environmental Policy Act, and a Draft CAA Conformity Determination in compliance with the CAA General Conformity Rule.

These documents are available for public review and comment.

The realignment of 180 F/A-18 aircraft and associated functions from NAS Cecil Field is mandated by the Defense Base Closure and Realignment Act (P.L. 101-510, Title XXIX). East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; Marine Corps Air Station (MCAS) Beaufort, South Carolina; and MCAS Cherry Point, North Carolina. Any aircraft relocated to MCAS Beaufort would utilize the Townsend Bombing Range in

This DEIS/Draft CAA Conformity Determination has been distributed to the U.S. Environmental Protection Agency; members of Congress; state governors and representatives; key federal, state, and local agencies; and private citizens. Single copies are available upon request by contacting Mr. Dan Cecchini at (757) 322-4891. Copies of the DEIS/Draft CAA Conformity Determination are also available for review at the following locations in South Carolina and Georgia:

**Beaufort County Library** 

Ida Hilton Public Library

311 Scott Street

1105 North Way

Beaufort, South Carolina

Darien, Georgia

Comments on the DEIS and Draft CAA Conformity Determination should be mailed to Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. Dan Cecchini (Code 2032 DC), 1510 Gilbert Street, Norfolk, Virginia 23511. Comments may also be faxed to Mr. Cecchini at (757) 322-4894.

A public hearing will be held in October for those individuals who would like to provide verbal or written comments on the DEIS or the Draft CAA Conformity Determination. An open information session, which will precede the scheduled public hearing, will allow individuals to review the data presented in the DEIS. The hearing has been scheduled at the following location in South Carolina:

Technical College of the Low Country

Building 12, Main Auditorium

921 Ribaut Road

Beaufort, South Carolina

Monday, October 20, 1997

Information Session: 3:30 - 7:00 pm

Formal Hearing: 7:30 - 10:00 pm

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final Environmental Impact Statement (FEIS) for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.

Any general questions or requests for clarification on the DEIS or public hearing/public comment schedule or procedures should be directed to Lt. Col. Keveline, Community Plans and Liaison Officer, MCAS Beaufort, (803) 522-7390, or Capt. Mason, Public Affairs Officer, MCAS Beaufort, (803) 522-7201.

Public notice appearing in The Darien News on September 25, 1997.

02: OV8903 D5321\NOTICES.P65(p4)

Georgia

# WE WANT YOUR INPUT ON THE F/A-18 DEIS!!

The Navy has completed a draft environmental impact statement (DEIS) for realignment of F/A-18 aircraft and operational functions from NAS Cecil Field, Florida, to other east coast installations and is seeking your comments. East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; MCAS Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

#### For information and to provide your comments, please plan to attend:

October 20, 1997
Technical College of the Low Country
Building 12, Main Auditorium
821 Ribaut Road
Beaufort, South Carolina
3:30-7:00 pm, Information Session
7:30-10:00 pm, Public Hearing

#### To review the DEIS, copies are available at:

Beaufort County Library 311 Scott Street Beaufort, South Carolina 2 Ida Hilton Public Library 1105 North Way Darien, Georgia

#### To mail in comments:

Commander, Atlantic Division Naval Facilities Engineering Command Attn: Mr. Dan Cecchini (Code 2032 DC) 1510 Gilbert St. Norfolk, Virginia 23511 Facsimile: (757) 322-4894

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final EIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.



Public notice appearing in The Darien News on October 16, 1997.

Georgia

02: OV8903\_D5321\Publicmtgnotices.P65 (p3)



# NOTICE OF AVAILABILITY AND PUBLIC HEARINGS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR REALIGNMENT OF F/A-18 AIRCRAFT AND OPERATIONAL FUNCTIONS FROM NAVAL AIR STATION (NAS) CECIL FIELD, FLORIDA, TO OTHER EAST COAST INSTALLATIONS, AND DRAFT CLEAN AIR ACT (CAA) CONFORMITY DETERMINATION

The Navy has completed a DEIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations, in compliance with the National Environmental Policy Act, and a Draft CAA Conformity Determination in compliance with the CAA General Conformity Rule.

These documents are available for public review and comment.

The realignment of 180 F/A-18 aircraft and associated functions from NAS Cecil Field is mandated by the Defense Base Closure and Realignment Act (P.L. 101-510, Title XXIX). East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; Marine Corps Air Station (MCAS) Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

This DEIS/Draft CAA Conformity Determination has been distributed to the U.S. Environmental Protection Agency; members of Congress; state governors and representatives; key federal, state, and local agencies; and private citizens. Single copies are available upon request by contacting Mr. Dan Cecchini at (757) 322-4891. Copies of the DEIS/Draft CAA Conformity Determination are also available for review at the following locations in Virginia:

Virginia Beach Central Library 4100 Virginia Beach Boulevard Virginia Beach, Virginia 23452 Great Neck Library 1251 Bayne Drive Virginia Beach, Virginia 23454 Chesapeake Central Library

298 Cedar Road

Chesapeake, Virginia 23320

Comments on the DEIS and Draft CAA Conformity Determination should be mailed to Commander, Atlantic Division, Naval Facilities Engineering Command, Attn: Mr. Dan Cecchini (Code 2032 DC), 1510 Gilbert Street, Norfolk, Virginia 23511. Comments may also be faxed to Mr. Cecchini at (757) 322-4894.

Public hearings will be held in October for those individuals who would like to provide verbal or written comments on the DEIS or the Draft CAA Conformity Determination. Open information sessions, which will precede each of the scheduled public hearings, will allow individuals to review the data presented in the DEIS. Hearings have been scheduled at the following locations in Virginia:

Virginia Beach Pavilion Convention Center Auditorium 1000 19th Street Virginia Beach, Virginia Monday, October 27, 1997 Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm Butts Road Intermediate School 1571 Mt. Pleasant Road Chesapeake, Virginia Tuesday, October 28, 1997 Information Session: 3:30 - 7:00 pm Formal Hearing: 7:30 - 10:00 pm

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final Environmental Impact Statement (FEIS) for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.

Any general questions or requests for clarification on the DEIS or public hearing/public comment schedule or procedures should be directed to Mr. Fred Pierson, Community Plans and Liaison Officer, NAS Oceana, (757) 433-3158.

Public notice appearing in *The Virginian–Pilot* on September 20, 21, and 22, 1997.

02: OV8903\_D5321\NOTICES.P65

Virginia

# WE WANT YOUR INPUT ON ● THE F/A-18 DEIS!!

The Navy has completed a draft environmental impact statement (DEIS) for realignment of F/A-18 aircraft and operational functions from NAS Cecil Field, Florida, to other east coast installations and is seeking your comments. East coast installations that meet the operational criteria for some or all of the aircraft include: NAS Oceana, Virginia; MCAS Beaufort, South Carolina; and MCAS Cherry Point, North Carolina.

#### For information and to provide your comments, please plan to attend:

October 27, 1997
Virginia Beach Pavilion
Convention Center Auditorium
1000 19th Street
Virginia Beach, Virginia
3:30-7:00 pm, Information Session
7:30-10:00 pm, Public Hearing

October 28, 1997 **Butts Road Intermediate School**1571 Mt. Pleasant Road
Chesapeake, Virginia
3:30-7:00 pm, Information Session
7:30-10:00 pm, Public Hearing

#### To review the DEIS, copies are available at:

Virginia Beach Central Library 4100 Virginia Beach Boulevard Virginia Beach, Virginia **Great Neck Library** 1251 Bayne Drive Virginia Beach, Virginia

Chesapeake Central Library 298 Cedar Road Chesapeake, Virginia

#### To mail in comments:

Commander, Atlantic Division Naval Facilities Engineering Command Attn: Mr. Dan Cecchini (Code 2032 DC) 1510 Gilbert St. Norfolk, Virginia 23511 Facsimile: (757) 322-4894

All comments received by November 18, 1997, will be considered and addressed as appropriate in the Final EIS for Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida, to Other East Coast Installations.



Public notice appearing in The Virginian-Pilot on October 18, 22, and 26, 1997.

Virginia

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### PUBLIC HEARING F/A-18 DRAFT ENVIRONMENTAL IMPACT STATEMENT

Realignment of F/A-18 Aircraft and Operational Functions From NAS Cecil Field, Florida to Other East Coast Installations.

Date:

November 17, 1997

Time:

5:00 - 7:00 pm Information Session

7:30 pm Public Hearing

(Written comments will be accepted

at both sessions.)

Where:

North Carolina Aquarium on Roanoke Island

Airport Rd., Manteo, NC

**Availability of DEIS:** 

Dare County Library 700 North U.S. 64/264

Manteo, NC

For further information, contact:

Mr. Dan Cecchini

Naval Facilities Engineering Command

(757) 322-4891

Public notice appearing in *The Virginian–Pilot* on October 10, 12, and 16, 1997; and the *Coastland Times* on November 11, 13, and 16, 1997.

North Carolina

02: OV8903\_D5321\Publicmtgnotices.P65 (p4)

implement and Department's Y2K five phase process are sufficient to ensure all mission critical systems will function properly on, before and after January 1, 2000.

In accordance with Section 10(d) of the Federal Advisory Commission Act, Public Law 92–463, as amended (5 U.S.C. App. II, (1994)), it has been determined that these DSB Task Force meetings concern matters listed in 5 U.S.C. 552b(c)(1)(1994), and that accordingly these meetings will be closed to the public.

#### L. M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense. [FR Doc. 97–30045 Filed 11–14–97; 8:45 am] BILLING CODE 5000–04–M

#### **DEPARTMENT OF DEFENSE**

#### Office of the Secretary

Defense Science Board Task Force on Satellite Reconnaissance

**ACTION:** Notice of advisory committee meetings.

SUMMARY: The Defense Science Board Task Force on Open Systems will meet in closed session on November 18–19, 1997 at Strategic Analysis, Inc., 4001 N. Fairfax Drive, Arlington, Virginia. In order for the Task Force to obtain time sensitive classified briefings, critical to the understanding of the issues, this meeting is scheduled on short notice.

The mission of the Defense Science Board is to advise the Secretary of Defense through the Under Secretary of Defense for Acquisition and Technology on scientific and technical matters as they affect the perceived needs of the Department of Defense. At this meeting the Task Force will examine the benefits of, criteria for, and obstacles to the application of an open systems approach to weapon systems, and to make recommendations on revisions to DoD policy, practice, or investment strategies that are required to obtain maximum benefit from adopting open systems. The Task Force should examine application to new defense programs, to those that have already made substantial investments in a design, and to those that are already fielded, across the spectrum of weapon systems, not just those heavily dependent on advanced computers and electronics.

In accordance with Section 10(d) of the Federal Advisory Committee Act, Public Law 92–463, as amended (5 U.S.C. App. II, (1994)), it has been determined that this DSB Task Force meeting concern matters listed in 5 U.S.C. 552b(c)(1) (1994), and that accordingly this meeting will be closed to the public.

Dated: November 10, 1997.

#### L.M. Bynum,

Alternative OSD Federal Register Liaison Officer, Department of Defense. .

[FR Doc. 97-30046 Filed 11-14-97; 8:45 am]

BILLING CODE 5000-04-M

#### **DEPARTMENT OF DEFENSE**

#### **Department of The Navy**

Notice of Extension of Public Comment Period for Draft Environmental Impact Statement (DEIS) for Realignment of F/A-18 Aircraft and Operational Functions From Naval Air Station (NAS) Cecil Field, Florida to Other East Coast Installations and Draft Clean Air Act (CAA) Conformity Determination

SUMMARY: The Department of The Navy Announces That the Public Comment Period For the Draft Environmental Impact Statement (DEIS) And Draft Clean Air Act (CAA) Conformity Determination Which Evaluates The Realignment of F/A–18 Aircraft And Operational Functions From NAS Cecil Field, Florida To Other Navy And Marine Corps Air Stations On The East Coast Of The United States Has Been Extended By Two Weeks To December 2, 1997.

Pursuant to section 102(2) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR parts 1500-1508) the Department of the Navy filed a DEIS with Environmental Protection Agency on September 12, 1997. A Notice of Availability of the DEIS was published in the Federal Register on September 19, 1997. This notice provided for a 60day public comment period on the DEIS which would have expired on November 18, 1997. However, due to the fact that an additional public hearing has been scheduled for November 17, 1997 at the NC Aquarium in Manteo, NC (see Federal Register: October 31, 1997, Page 58950), the Navy has decided to extend the public comment period on the DEIS to December 2, 1997. All comments/ questions on the DEIS must be received by close of business (5 p.m.) on this date. Comments may be mailed to: Commander, Atlantic Division, Naval Facilities Engineering Command, Attention: Mr. Dan Cecchini (Code 2032DC), 1510 Gilbert Street, Norfolk, VA 23511. Comments may also be faxed to (757) 322-4894.

POINT OF CONTACT: Additional information concerning this notice may be obtained by contacting Mr. Cecchini at (757) 322–4891.

Dated: November 7, 1997.

#### Darse E. Crandall,

LCDR, JAGC, USN, Federal Register Liaison Officer.

[FR Doc. 97–29940 Filed 11–13–97; 8:45 am]

BILLING CODE 3810-FF-M

#### **DEPARTMENT OF EDUCATION**

### Submission for OMB Review; Comment Request

**AGENCY:** Department of Education. **ACTION:** Submission for OMB review; comment request.

SUMMARY: The Deputy Chief Information Officer, Office of the Chief Information Officer, invites comments on the submission for OMB review as required by the Paperwork Reduction Act of 1995.

**DATES:** Interested persons are invited to submit comments on or before December 17, 1997.

ADDRESSES: Written comments should be addressed to the Office of Information and Regulatory Affairs, Attention: Dan Chenok, Desk Officer, Department of Education, Office of Management and Budget, 725 17th Street, NW., Room 10235, New Executive Office Building, Washington, DC 20503. Requests for copies of the proposed information collection requests should be addressed to Patrick J. Sherrill, Department of Education, 600 Independence Avenue, S.W., Room 5624, Regional Office Building 3, Washington, DC 20202—4651.

FOR FURTHER INFORMATION CONTACT: Patrick J. Sherrill (202) 708–8196. Individuals who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339 between 8 a.m. and 8 p.m., Eastern time, Monday through Friday.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its

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Derived from ATAC Corporation NAS Oceana, Airfield and Airspace Operational Study of the 1995 BRAC Realignment of Navy F/A-18 Squadrons, February 1998. MCAS Beaufort was not subject to the Naval Aviation Simulation Model (NASMOD) analysis.

# Airfield and Airspace Operational Study for the 1995 BRAC Realignment of Navy F/A-18 Aircraft

February 18, 1998

Submitted under contract N68925-93-D-A093



Naval Facilities Engineering Command

Department of the Navy

Alexandria, Virginia



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#### **PREFACE**

The Airfield and Airspace Study for the 1995 BRAC Realignment of Navy F/A-18 Aircraft was conducted by ATAC Corporation under Work Order Number 13 of Contract Number N68925–93–D–A093. The Naval Aviation Simulation Model, NASMOD, the primary tool used to produce this study, was developed by ATAC for the Naval Facilities Engineering Command (NAVFAC).

The ATAC analysts for this study, and the authors of this report, are Derek Huber, Eric Boyajian, and Joe Martin. Michael Abkin is overall project manager. The authors acknowledge the indispensable contributions throughout this study of other members of ATAC's NASMOD team and of our Navy, Marine Corps, and Air Force points of contact.

#### **Update Note:**

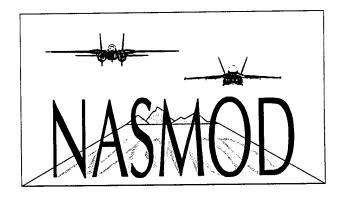
This final report is an update to the final report originally issued August 22, 1997. Several tables and figures have been modified, including Tables 2-4, 2-5, and 2-7 and Figure 4-4, to reflect current information and to correct reported data. Also, descriptions of the Manteo/Dare County Regional Airport runways have been updated (see Section 4).

Subsequent to publication of the August 1997 Final Report, the Navy reduced the number of F-14 aircraft in fleet squadrons and in the F-14 fleet replacement squadron (FRS). The reduction was a function of the age of some F-14 aircraft. As a result, the eleven F-14 fleet squadrons at NAS Oceana will be reduced from 150 to 114 F-14 aircraft, and the FRS will be reduced from 48 to 33 aircraft. The total F-14 aircraft at NAS Oceana is now 147. The maximum number of pilots per squadron will also be reduced from 18 to 15. There will be no reduction in the number of pilots in the FRS.

As a result of these reductions in aircraft and pilots, the number of sorties projected by F-14 fleet squadrons is estimated to decrease by 17 percent from those identified in the August report. In calculating this percent reduction, the reduction in pilots per squadron was assumed to affect the frequency of all flight types equally. Although the number of FRS aircraft is reduced from 48 to 33, the number of pilots in the FRS and the FRS pilot training requirements will remain unchanged. The projected sorties for the FRS will be identical to those identified in the August report.



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**EXECUTIVE SUMMARY** 

#### **EXECUTIVE SUMMARY**

This study examines the capability of NAS Oceana and MCAS Cherry Point, including NALF Fentress, MCALF Bogue, and the local airspace and ranges, to accommodate the prospective levels of operations resulting from the implementation of BRAC 95-related decisions. This analysis is accomplished through the use of a fast-time computer simulation model, NASMOD.

Five alternative relocation scenarios (ARS) were identified by the Navy for analysis. Each scenario represents an alternative base-loading squadron mix in a future year (i.e., FY99) following the relocation and realignment of the modeled squadrons. A baseline scenario was analyzed with which to compare the alternatives.

The tenant mix for the Baseline Scenario is as follows:

NAS Oceana	MCAS Cherry Point
7 F-14 Atlantic fleet squadrons	3 AV-8 fleet squadrons
4 F-14 Pacific fleet squadrons	1 AV-8 FRS
1 F-14 FRS	4 EA-6B squadrons
1 F/A-18 adversary squadron	1 KC-130 fleet squadron
,	1 KC-130 FRS

The alternative scenarios specify the location of the Atlantic F/A-18 squadrons as follows:

	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
NAS Oceana	11 + FRS	9 + FRS	8 + FRS	6 + FRS	6 + FRS
MCAS Cherry Point			3		5
MCAS Beaufort		2		5	

The impacts of Navy squadron realignment alternatives on MCAS Beaufort and that air station's surrounding training areas is not examined in the study.

On an annual basis, the increase in flight operations from the realignment of the Navy F/A-18 squadrons does not affect the ability of the squadrons to complete their overall flight requirements. Although increases for most aircraft groups in adjusted and postponed flights do occur in the alternative scenarios, no significant postponements in flight scheduling are experienced. Some adjustments are made to alternative or less-preferred training areas for most squadrons. Also, shifting of flight launch times due to adjusted training area selections affect squadron aircraft allocation and overall scheduling efficiency.

The impacts to airfield operations at NAS Oceana by a comparison between the Baseline Scenario and ARS-1 are as follows:

- Operations increase by about 120 percent.
- NALF Fentress experiences an increase of 51 percent in operations.
- Taxi delay rises from an average of 1.0 minute to 1.9 minutes per sortie.



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• Completion of desired return-to-base pattern operations drops from 98.0 percent (average over all aircraft groups) to 92.8 percent.

The impacts to airfield operations at MCAS Cherry Point relative to the Baseline Scenario are as follows:

- Operations increase 18 percent (ARS-3) and 26 percent (ARS-5).
- Night (2200 to 0700) operations increase by 85 percent (ARS-3) and 113 percent (ARS-5).
- Average taxi delay increases by about six seconds per sortie in ARS-3 and eight seconds per sortie in ARS-5.
- Pattern event completion rate drops from 96.8 percent to 94.2 percent (ARS-3) and 94.4 percent (ARS-5).

The realigned Navy F/A-18 squadrons have a significant impact on local training area operations. The W-72 TACTS range and Navy Dare County Range approach capacity limits.

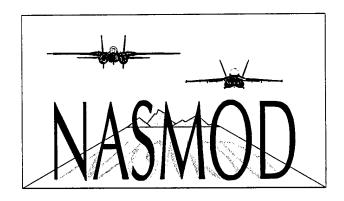
- The W-72 TACTS range is utilized about 83 percent of its published hours on average over the simulated year in ARS-1. Scheduling inefficiencies and demand peaking from among the squadrons preclude the possibility of scheduling 100 percent of the available hours for the whole year, and annual average utilization rates of 80 percent to 85 percent may be a practical upper limit given the current scheduling procedures and requirements.
- The Navy Dare County Range utilization rate is about 65 percent. Results suggest that as Navy Dare's utilization rate approaches 70 percent, the range approaches "capacity," or saturation.

From a schedule capacity point-of-view, BT-11 and BT-9 have the ability to accommodate increased operations after the realignment of the Navy F/A-18 squadrons (in any scenario).

- The BT-11 utilization rate is approximately 50 percent on average during the year for all the alternative scenarios (42 percent in the Baseline Scenario).
- BT-9 is utilized about 20 percent of its available hours during the year.

No significant impact on civilian traffic is caused by the additional R-5314 operations resulting from the realignment of Navy F/A-18 squadrons to the region.





**INTRODUCTION** 

#### 1 INTRODUCTION

This study examines the capability of Naval Air Station (NAS) Oceana and Marine Corps Air Station (MCAS) Cherry Point, including Naval Auxiliary Landing Field (NALF) Fentress and Marine Corps Auxiliary Landing Field (MCALF) Bogue Field, and the related ranges, military operations areas (MOAs), warning areas, and restricted areas, to accommodate prospective levels of operations resulting from 1995 Base Realignment and Closure (BRAC 95)-related decisions. Figure 1-1 depicts the general study region. This section describes the issues and objectives of the study, the methodology followed, data sources, and the contents of this report.

### 1.1 Issues and Study Objectives

The Navy has identified several issues associated with the BRAC 95-related decisions to single site the F-14 squadrons at NAS Oceana and to relocate NAS Cecil Field-based F/A-18 squadrons. These issues include:

- The sufficiency of airfield, airspace, and range capacity to accommodate the projected activity in the NAS Oceana and MCAS Cherry Point region;
- The ability of squadrons to meet their training requirements; and
- The environmental impacts on the military facilities, training areas, routes, and ranges, as well as the communities surrounding them.

Fiscal Year 1999 (FY99) is the simulation period; the proposed relocations of the F-14 fleet squadrons from NAS Miramar and the F/A-18 fleet squadrons and F/A-18 fleet replacement squadron (FRS) from NAS Cecil Field are assumed to be completed by this year.

The principal study objective is to provide the Navy with an analysis of operations within the study region under alternative base loading conditions that address these issues. The results presented are inputs to noise and environmental impact studies.

### 1.2 Study Methodology

The study methodology employs a general simulation model for naval aviation operations, the Naval Aviation Simulation Model (NASMOD). Using data and information supplied by the Navy, Marine Corps, and Air Force, ATAC configured NASMOD to represent the aviation activities at NAS Oceana and MCAS Cherry Point with the existing and proposed tenants. These simulation inputs reflect the anticipated operations at the modeled airfields and airspace including several associated bombing ranges, MOAs, and warning and restricted areas.



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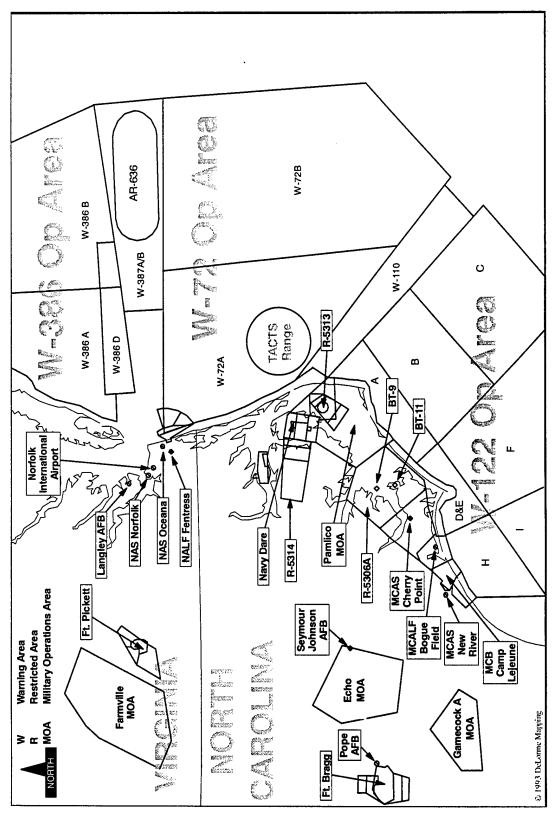


Figure 1-1: Airspace Study Region



#### 1.3 NASMOD Background

The development of NASMOD was motivated by a need within the Navy for a technically credible tool to objectively and efficiently analyze options in a number of critical naval aviation decision areas. For example:

- Base closings and realignments. Is there sufficient airfield and airspace capacity at selected sites to accommodate the training requirements of both existing and realigned military users? What operational alternatives are there that could potentially mitigate capacity constraints? What are the potential impacts on civilian traffic in the area?
- Changes in special use airspace. What operational efficiencies are attainable from proposed modifications to MOAs, warning areas, and other military special use airspace areas (SUAs); or from proposed changes in operating schedules and configurations of such areas? What would be the training and cost impacts to the military of restrictions on the availability or use of such areas? What impacts might there be on civilian traffic?
- Interactions between civilian and military air traffic. What are the cost and operational impacts on military and civilian users of shared airspace due to: projected growth in levels of activity, changes in instrument flight rule (IFR) routes and/or air traffic control (ATC) procedures, or changes in the operational requirements of the users?
- New aircraft types. What are the airfield and airspace impacts associated with the introduction of a new aircraft type and its affiliated training requirements? What procedural or operational changes in airfield and airspace management, schedules, and configurations are feasible to mitigate identified constraints?
- Changes in training and resource requirements. What airfield and airspace modifications may be required due to changes in mission (e.g., the addition of night bombing to the F-14 mission), pilot training requirements (e.g., increased flight hours in the Training and Readiness Matrix for certain training events), or training resource requirements (e.g., instructors, adversary aircraft, target facilities)? What operational changes in airfield and airspace management, schedules, and configurations are feasible?
- Environmental assessments and environmental impact statements. What are the potential impacts on airfield operations and utilization of ranges and SUAs, which in turn have noise and other environmental impacts, due to changes in operations?

NASMOD is derived directly from two other general simulation models: the Navy Air Training System Model (NATS) and the Airfield and Airspace Capacity Model (SIMMOD). NATS was developed in the mid-1980s for analysis of special use airspace and other resource impacts on basic flight training at NAS Whiting Field, Florida. The design of the model was specialized for that particular application. SIMMOD, conversely, is the official simulation model of the Federal Aviation



Administration (FAA) and is used in terminal and en route airspace environments for analysis of airfield and airspace capacity issues. It has been validated and used in numerous studies for the analysis of airport layouts, runway and taxiway procedures, sectorization plans, air traffic control procedures, traffic management strategies, and traffic routing. NASMOD incorporates the functionality of NATS, the simulation and analytical capabilities of SIMMOD, and also includes advanced database and analytical capabilities necessary to model complex tactical military training operations.

NASMOD is a fast-time computer simulation model composed of:

- A graphical user interface (GUI) for data entry, including database table editing and graphical tools for building airfields, routes, and mission profiles; simulation control; and results analysis, including a database querying tool;
- A traffic animator, which replays a simulated day of air traffic and training operations as an animated, graphical approximation of the events simulated by the NASMOD mathematical model;
- Relational databases of input and output data, wherein the input data control
  the model assumptions and parameters, and the output data contain the results
  for the simulation period;
- Simulation modules that model squadron mission scheduling, central scheduling of airspace areas, and the evolution of military missions and their interactions with other modeled traffic; and
- A performance calculator that computes selected measures of performance for squadrons and their training activities, airfield operations, and airspace and range area scheduling and utilization.

Appendix D provides an overview of the NASMOD simulation model components.

### 1.4 Study Process

A NASMOD study consists of four basic phases: study design, data collection, model development, and scenario simulation and analysis. Each study is a highly iterative and interactive process requiring extensive coordination between the analysts and the data sources during all phases. Often, information learned and insights gained during a later phase of the study necessitate revisiting earlier phases before proceeding. Occasionally, assumptions are adjusted, data collection is revised, or the scenario design is modified.

### 1.4.1 Study Design

During the design phase of a study, analysts and military personnel meet and determine the baseline and operating alternatives, including the assumptions



governing each. Occasionally, modifications or updates are required to reflect results of the analysis in progress, particularly when the need for a more detailed analysis is recognized or an area of interest changes due to a dynamic decision.

### 1.4.2 Data Collection Requirements and Sources

During the data collection phase of the study, analysts collect the large volume of data required for model construction and analysis. These data describe current and proposed operations. For this study, there are three general categories of data sources: publications; personal interviews and observations of operations; and records of actual airfield and airspace operations. The References section lists all of the documents, publications, and other direct and indirect sources used. Examples of the published information include: letters of agreement, maps and charts of airspace structures and airfield facilities, approach plates, computer-aided design (CAD) and other engineering drawings, the air operations manual, and range regulations. Examples of information gathered through interviews and direct observations include: ATC procedures, flight profiles, flight scheduling requirements, and squadron deployment specifications. Actual operations records include: ATC facility logs, traffic analyzer data, and squadron flight schedules.

### 1.4.3 Model Development

Preparation of the NASMOD input database involves analyzing the collected data and extracting and assembling the essential information. Analysts convert this information into the format required by the model, enter the data, and then test various parameters for accuracy.

### 1.4.4 Simulation and Analysis of Alternative Scenarios

Each alternative scenario requires a separate database with parameters set to reflect the appropriate assumptions. The model simulates the air traffic and training operations associated with those assumptions. For this study, ATAC uses a one-year simulation period. Results from the one-year period account for the seasonal variation in operations and the impact of unit deployment schedules. Simulation results are used in the analysis to identify, quantify, and compare the differences between the baseline and operating alternatives.

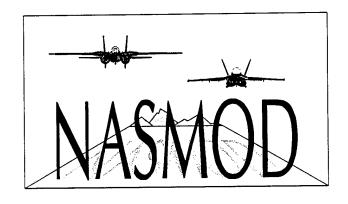
### 1.5 Report Contents

This report documents the process, assumptions, results and analyses of the Airfield and Airspace Operational Study for the 1995 BRAC Realignment of Navy F/A-18 Aircraft (hereinafter referred to as the Navy F/A-18 Realignment Study). The report contains four additional sections. These sections describe the model building process with a description of the alternative scenarios and their associated



assumptions, the comparative analysis among the alternatives based on simulation results, and the summary and conclusions. The appendices contain a description of the model and selected detailed results. A glossary of terms and lists of references and acronyms are also provided.





# SCENARIO SPECIFICATION AND MODEL DEVELOPMENT

#### 2 SCENARIO SPECIFICATION AND MODEL DEVELOPMENT

This section describes the model development process and provides detailed information about the baseline and five alternative base-loading scenarios studied. It provides an overview of the key logical and data assumptions that comprise the Navy F/A-18 Realignment Study, including airfield and airspace data, training area descriptions, and user operations characteristics.

### 2.1 Scenario Specifications

The five alternative scenarios for this study are unique base-loading possibilities involving Navy F/A-18 squadrons from NAS Cecil Field. All assumptions governing the baseline scenario also apply to each alternative scenario unless specifically stated otherwise in the following discussions. Table 2-1 summarizes the Navy F/A-18 squadron base loading for each alternative scenario. Note that, although two scenarios assume F/A-18 assets are relocated to MCAS Beaufort, analysis of the impacts on the MCAS Beaufort area of this relocation is outside the scope of this study.

The alternative realignment scenario (ARS) designation reflects the numbering of the scenarios in the environmental impact statement (EIS) for which this study is a data source.

Table 2-1: Alternative Relocation Scenarios of the Navy F/A-18 Squadrons

	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
NAS Oceana	11 + FRS	9 + FRS	8 + FRS	6 + FRS	6 + FRS
MCAS Cherry Point			3		5
MCAS Beaufort		2		5	

The Baseline Scenario against which the above alternatives are compared assumes that four Pacific Fleet F-14 squadrons are based at NAS Oceana along with seven Atlantic Fleet F-14 squadrons, one F-14 fleet replacement squadron (FRS), and one Navy F/A-18 adversary squadron. Based at MCAS Cherry Point are three AV-8 fleet squadrons, one AV-8 FRS, four EA-6B squadrons, one KC-130 fleet squadron, and one KC-130 FRS. In the Baseline Scenario, all Navy A-6 squadrons at NAS Oceana are decommissioned, and the base loading at MCAS Cherry Point reflects current conditions.

The EIS specification of ARS-5 includes the addition of a new runway parallel to Runway 23R at MCAS Cherry Point. This study does not address the quantitative impacts of the parallel runway. However, descriptions of the location and specifications of the parallel runway (that are currently known) and changes that will be made to the air station's patterns and operations are provided in Section 2.3.4.1. A qualitative assessment of the impacts of the parallel runway is presented in Section 3.



#### 2.2 Airfield Operations

NAS Oceana and MCAS Cherry Point are master Navy and Marine Corps air stations in Virginia and North Carolina, respectively. Other Navy/Marine Corps airfields in the region include NAS Patuxent River, NAS Norfolk, and MCAS New River; these three air stations are not under consideration as sites for basing Navy F/A-18 squadrons.

#### 2.2.1 NAS Oceana Operations

The NAS Oceana airfield is located approximately 3½ miles west of the Atlantic coast in Virginia Beach, Virginia, as shown in Figure 2-1. NALF Fentress, an outlying airfield used primarily for field carrier landing practice (FCLP) operations, is located about 8½ miles southwest of NAS Oceana. This region has experienced substantial commercial and residential growth in recent years with significant development occurring just outside the confines of the air station.

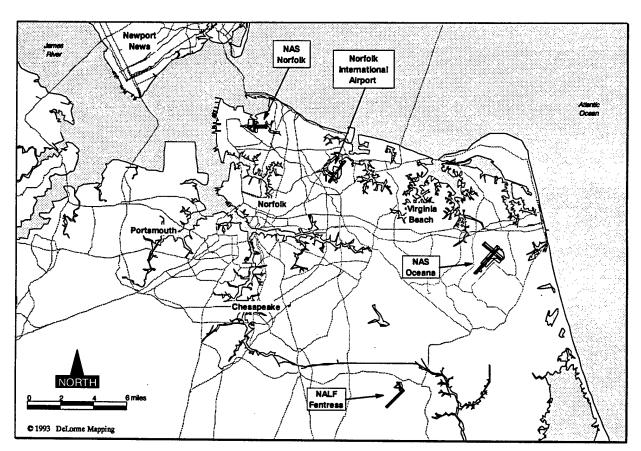


Figure 2-1: Vicinity of NAS Oceana

NAS Oceana has two sets of dual runways for arrival and departure traffic. Runways 5L/R (left/right) and 23L/R are the "calm wind" runways. These runways are preferred at times when wind is not a constraining factor (typically less than 3 knots) due to their length, orientation with respect to arrival and



departure routings, and proximity to desired ground features such as high speed exits and fuel pits. Figure 2-2 depicts the proposed NAS Oceana airfield layout after the proposed realignment of the F-14 and F/A-18 squadrons.

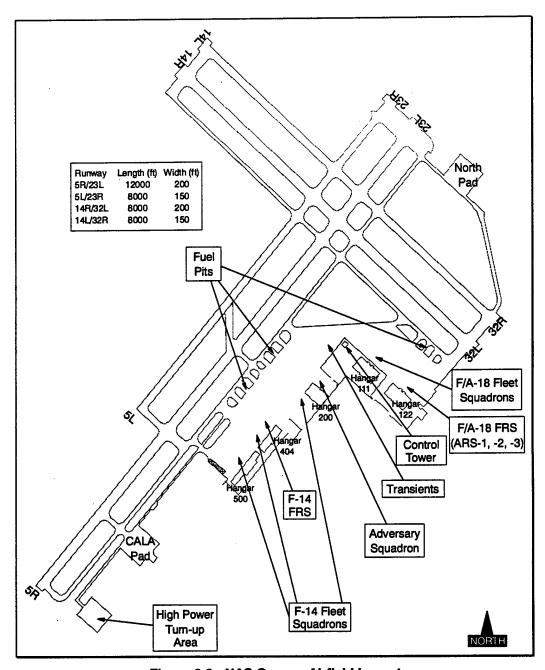


Figure 2-2: NAS Oceana Airfield Layout

In general, airfield operations for all scenarios modeled in NASMOD are in accordance with published ATC procedures and consistent with the current NAS Oceana Air Operations Manual. However, to facilitate timely development of the NAS Oceana airfield model, all the airfield operations are "mapped" to one duty runway plan (Runways 5R and 5L). This greatly reduces the modeling effort while



achieving the desired results with no significant loss of accuracy. NAVFAC and NAS Oceana base operations representatives concurred with this approach. Therefore, results related to specific runways are not addressed in this study; however, such statistics can be derived by distributing the total operations among the runways based on their historical proportion of total usage.

This approach is supported by several NAS Oceana airfield characteristics, including:

1. The airfield consists of two pairs of dual runways (5/23 and 14/32) aligned about 90 degrees from each other. Historically, total airfield operations have been distributed by runway pair as follows:

Runway Pair	Operations Distribution
5	50%
14	2%
23	34%
32	14%

- 2. There is no significant difference between the duty runways in the total time required by aircraft to taxi for takeoff and return to the ramp after landing. There is somewhat less room for aircraft holding for departures on Runway 32.
- 3. Overhead break approaches and precision approach landing system (PALS) approaches are available to all four runway pairs. Standard departures can be made from all the runways. Instrument carrier landing system (ICLS) services are available on Runway 5R.
- 4 Each of the runway pairs has a visual pattern and a GCA box pattern. The capacities of the patterns are the same for each runway pair.
- 5. Field carrier landing practice (FCLP) can be performed on each of the four runway pairs.

The airfield facilities and ground activities (i.e., aircraft parking areas, refueling pits, and taxiways) are modeled according to the current airfield layout and operating procedures. A node/link network in NASMOD represents the runway/taxiway/parking area. Airfield nodes are placed at physical positions where aircraft interact or where significant events (in terms of aircraft movements) occur, including the ends of runways, runway exits, runway/taxiway crossing points, taxiway/taxiway crossing points, refueling pits, and parking areas. A link is the travel path between two nodes. Figure 2-3 depicts the node/link network constructed for NAS Oceana.

The direction in which links can be traversed and the type of operation that can use a link (that is, arrivals only, departures only, or both arrivals and departures) are inputs to the model. In traveling between two ground nodes (e.g., fuel pit and hangar), the taxipath to be used by an individual aircraft can be either pre-specified in the NASMOD input or determined by the model logic to achieve the minimum-time routing. The minimum-time routing logic is implemented as much as possible



except in cases where specific directionality is required, such as when aircraft pass through the fuel pits.

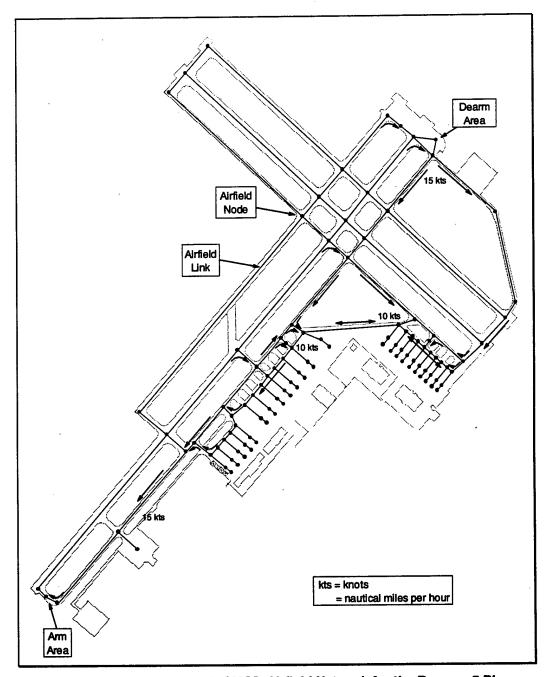


Figure 2-3: NAS Oceana NASMOD Airfield Network for the Runway 5 Plan

Operations at the aircraft parking areas are not modeled in detail. Squadron parking areas, in which a specific squadron or squadrons park, are defined instead of parking spaces for individual aircraft. The capacity of a squadron parking area is defined as the total number of individual aircraft capable of being parked there. The squadron parking area allocation is based primarily on the actual squadron



2–5 C–37 areas utilized during FY95. This is adjusted to accommodate the newly based F/A-18 aircraft. The parking area links shown in Figure 2-3 are not intended to depict actual aircraft parking rows. Modeling of activity within an individual squadron — that is, the interaction of aircraft in the parking area and maneuvering on the ramp area — is beyond the scope of this study.

The nominal taxi speed for aircraft is assumed to be 10-15 knots; however, taxi speeds along selected segments differ in order to reflect those areas of the airfield where aircraft tend to move faster or slower than this nominal speed (e.g., inner or outer taxiway). Traffic congestion that occurs during the simulation results in longer taxi times. These statistics are collected during the simulation analysis. The predominant directions of travel as well as nominal taxi speeds are indicated in Figure 2-3.

Fuel pit availability is generally determined by funding and staffing limitations, as well as squadron demand. Such constraints are modeled within NASMOD by specifying the maximum number of aircraft that can be simultaneously refueled in the pits. After consultation with base operations personnel, fuel pit availability for the F/A-18 realignment scenarios is assumed to permit simultaneous refueling of up to four aircraft in the fuel pits along the west ramp area and up to four aircraft along the east ramp. This level of fuel pit staffing is speculative yet reasonable in view of the historical levels of fuel pit staffing by the proposed future NAS Oceana tenant squadrons. Figure 2-2 shows the locations of the fuel pits.

The time required for hot refueling depends on the amount of fuel consumed during the previous flight. Refueling time is typically about eight minutes for F-14 and F/A-18 aircraft.

A decision to use the fuel pits is based primarily on an estimation by the aircrew as to whether or not refueling in the pits is faster than on the ramp. When the pits are full, aircraft must wait on the outer taxiways. When these get full, tower controllers direct aircraft to wait on the inner taxiways. This does not occur frequently since most aircrews will opt to refuel back at their line when the fuel pits are so congested. When FCLP or other missions requiring a fast turn-around of aircraft are being conducted, a squadron may staff extra fuel pits or give these missions priority when refueling. For the NASMOD simulations, it is assumed that all aircraft that can physically fit in the fuel pits (e.g., military jets, smaller turboprops) will try to refuel this way. Another assumption is that a maximum of twelve aircraft, six on the west ramp and six on the east, will wait for an available fuel pit; beyond these amounts, it is assumed that the aircraft is refueled on its line. Aircraft returning from FCLP sorties are an exception in that they are assumed to be able to refuel in the pits immediately after landing, entering the fuel pit area without waiting in the queue.

### 2.2.2 NALF Fentress Operations

NALF Fentress is used primarily by Navy fixed-wing aircraft from NAS Oceana and NAS Norfolk for FCLP operations. NALF Fentress is used infrequently for



other military training purposes, such as parachute and towed-banner drops. This usage is of lower priority, is scheduled not to conflict with FCLP operations, and is thus considered negligible for purposes of this study. Due to foreign object damage hazard, only E-2/C-2 aircraft are permitted to make full-stop landings for crew changes. No more than five aircraft are permitted simultaneously in the pattern.

The airfield has one runway (5/23) equipped to simulate an aircraft carrier flight deck and is available for FCLP training 24 hours a day except for the following times:

1115-1230 and 1630-1730 Monday, Tuesday, Wednesday, Friday, and Saturday;

0600-1400 and 1630-1730 Thursday; and

0600-1300, 1630-1730, and 1900-2100 Sunday.

### 2.2.3 MCAS Cherry Point Operations

MCAS Cherry Point is located midway along the Atlantic Coast of North Carolina, southeast of New Bern on the south bank of the Neuse River (see Figure 2-4).

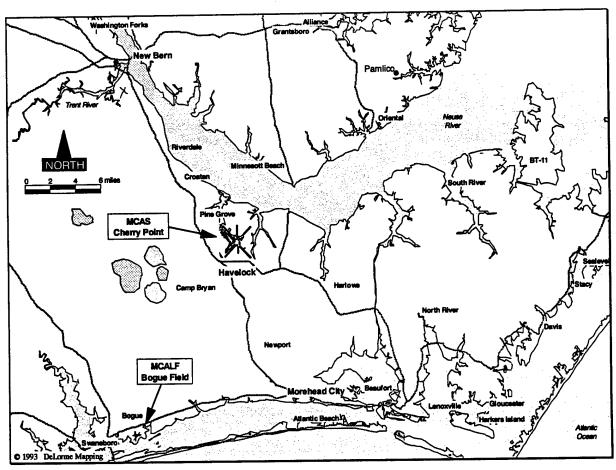


Figure 2-4: Vicinity of MCAS Cherry Point

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MCAS Cherry Point utilizes two pairs of offset runways for arrival and departure traffic and several pads for AV-8 and helicopter operations as shown in Figure 2-5. The main landing area consists of runways, which are offset to form a common centermat area. Takeoffs are made from the center of the airfield and landings are made toward the center of the airfield. Four AV-8 pads are available for vertical takeoffs and landings: North, South, Northeast, and Southeast pads. Precision approach radar (PAR) services are available to all arrival runways (32L, 23R, 14L, 05R). Carrier deck lighting is available on Runway 23R.

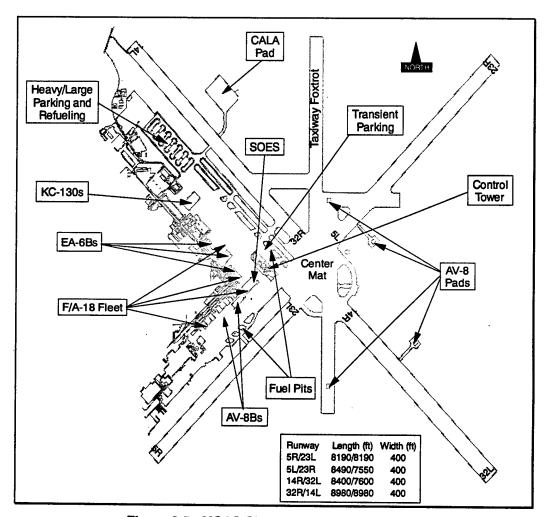


Figure 2-5: MCAS Cherry Point Airfield Layout

In general, airfield operations for all scenarios modeled in NASMOD are in accordance with published ATC procedures and consistent with the current MCAS Cherry Point Air Operations Manual. However, to facilitate timely development of the MCAS Cherry Point airfield model, most runway operations, with the exception of FCLPs, are "mapped" to one duty runway plan (Runways 32L and 32R). This greatly reduces the modeling effort while achieving the desired results with no significant loss of accuracy. NAVFAC and MCAS Cherry Point air traffic representatives concurred with this approach. The GCA box pattern, instrument



approaches, and the visual touch-and-go pattern in the model are associated with Runway 32L. The primary departure runway is Runway 32R.

To reflect the flexibility and capacity of the MCAS Cherry Point airfield, Runway 23L is also used for IFR (instrument flight rules) and VFR (visual flight rules) departures and Runway 23R for straight-in VFR arrivals to a full-stop landing, in order to expedite traffic during high tempo operations or when requested by pilots.

Navy aircraft are modeled in a similar manner to those based at NAS Oceana and adjusted to conform with MCAS Cherry Point procedures and operations. Hangar assignments for all squadrons currently based at MCAS Cherry Point are the same in all scenarios. The F/A-18 fleet squadrons are assigned hangar locations in ARS-3 that include them (see Figure 2-5). The NASMOD node/link network representing the MCAS Cherry Point runways, taxiways, and parking areas is shown in Figure 2-6.

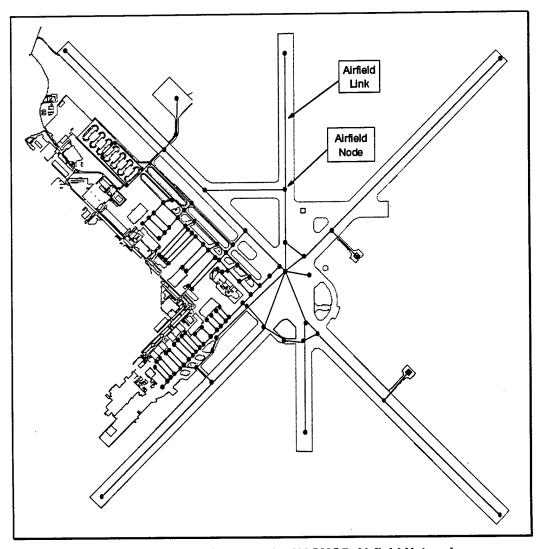


Figure 2-6: MCAS Cherry Point NASMOD Airfield Network

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On the airfield, the nominal aircraft taxi speed is assumed to be 15 kts; however, taxi speeds along selected segments differ in order to reflect those areas of the airfield where aircraft tend to move faster or slower than this nominal speed (e.g., refueling pits). Departing aircraft maneuvering in the departure staging area, the centermat, are assumed to move slower than the nominal taxi speed; therefore, speeds in this area are also adjusted to lower than the nominal.

The airfield is open 24 hours per day, but overhead break arrivals and touch-and-go operations are limited to the hours between 0700 and 2300 (all times are local). Navy FCLP operations, however, can be scheduled after 2300; by modeling no restriction on the scheduling times for FCLPs, a better understanding of the extent of potential impacts could be attained for analysis purposes. MCAS Cherry Point ATC personnel supported this modeling approach, which in fact reflects current operating procedures that allow squadrons to request extended airfield hours. The airfield is closed on all federal holidays.

Aircraft are separated based on standard FAA and military operating procedures for aircraft separation. When the weather condition changes at the air station, departure and arrival procedures change. Aircraft are released at greater intervals when the weather is below basic VMC. Aircraft operating under IFR are always separated by at least 3 NM from other traffic.

Future operations by VMU-2, an unmanned aerial vehicle (UAV) squadron of about four aircraft, will be infrequent and are assumed to have little impact on existing operations.

### 2.2.4 MCALF Bogue Field Operations

MCALF Bogue Field is the primary location for AV-8 forward base operations training and field carrier landing practice. The AV-8 training squadron is the primary user of this airfield; however, along with normal AV-8 fleet squadron usage, one large exercise per year is conducted at Bogue Field, and various smaller exercises with different services are performed throughout the year.

Bogue Field is open 10 hours per day Monday through Thursday with opening times as early as 0600. The field is open 0900–1200 Friday, and closed on the weekends. However, the field will open for weekends and after-hours during special exercises. Most operations are scheduled between 0900 and 2200, with only a few instances of after-hours and weekend operations during the year. The field is closed when MCAS Cherry Point is closed for holidays.

All operations are scheduled, and closed-field operations are not permitted. Priority for scheduling is equal among MCAS Cherry Point-based squadrons, except for Navy and Marine Corps exercises which have the highest scheduling priority. All other Marine Corps aircraft have third priority, all other Navy aircraft have fourth priority, and all other military aircraft have the lowest priority.



### 2.3 Airspace Operations

Air routes associated with NAS Oceana and MCAS Cherry Point operations are modeled within NASMOD as a node/link network similar to the one representing the airfield. These routes are modeled using descriptions from flight publications and information collected during interviews with pilots and ATC personnel. Airspace nodes are placed at physical positions where aircraft interact or where significant events in terms of aircraft movements occur (e.g., crossing points, altitude restrictions, route mergers).

NASMOD routes for airport traffic areas represent the nominal radar vector and VFR flight paths used in controlling aircraft in the airspace for ground controlled approaches (GCAs), carrier controlled approaches (CCAs), visual and instrument patterns, and VFR traffic within a five-statute-mile radius of the airport. Flights arriving, departing, and operating within the studied airspace on published IFR routings are modeled in accordance with current en route and terminal separation standards. Routings within the airspace that are normally utilized for VFR operations are modeled as published and as described by pilots and ATC personnel.

Aircraft speeds are modeled in accordance with Federal Air Regulations and pilot descriptions of aircraft performance characteristics for profiled activities. The definition of links and associated speed data accounts for speed variations based on aircraft type, the state of flight, and local procedures. Maximum, minimum, and nominal flight speeds for a link are based upon operating characteristics of specific groups of aircraft (i.e., heavy jet, large jet, military jet, military prop, and helicopter) and are used in simulating traffic movements, including allowable controller speed control and spacing actions. Standard rates of climb and descent for the general categories of aircraft are also incorporated into the routings. NASMOD in-trail spacing requirements are consistent with actual air traffic procedures. Wake turbulence spacing is applied as necessary between aircraft of different weight classes.

### 2.3.1 NAS Oceana Airspace Description

The NAS Oceana Radar Air Traffic Control Facility (RATCF) provides radar air traffic control services for all controlled airspace delegated to NAS Oceana RATCF by the FAA's Washington Air Route Traffic Control Center and Norfolk Approach Control as defined by letters of agreement. While this serves primarily NAS Oceana and NALF Fentress, several other small, uncontrolled general aviation and military airfields are located within the RATCF's airspace. This region encompasses much of the Atlantic coast from the mouth of the Chesapeake Bay to the northern end of Pamlico Sound. See Figure 2-7 for approach control boundary depiction and stratification descriptions.

Washington Air Route Traffic Control Center (ARTCC), Fleet Area Control and Surveillance Facility, Virginia Capes (FACSFAC VACAPES), and MCAS Cherry



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Point Approach Control also have air traffic control responsibilities in close proximity to the region.

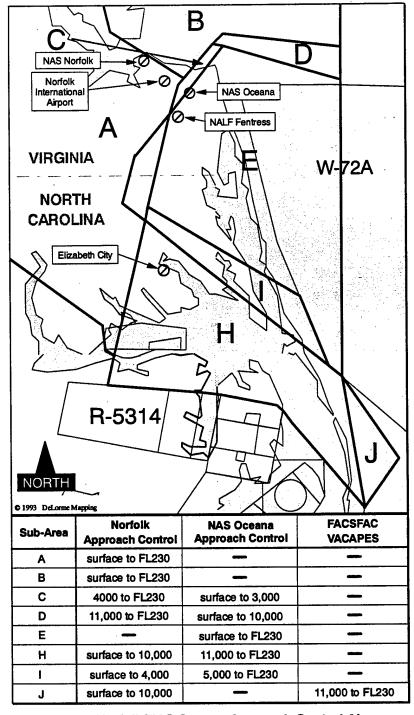


Figure 2-7: Norfolk/NAS Oceana Approach Control Airspace

### 2.3.2 NAS Oceana and NALF Fentress Routes and Patterns

The NASMOD airspace network is constructed to permit the analyst to accurately model distances between key spatial locations at which interactions between aircraft may occur. The distances defined by the airspace network correspond to actual flight track lengths. Figure 2-8 shows a geographic depiction of the modeled flight tracks associated with the Runway 5 plan at NAS Oceana and NALF Fentress.

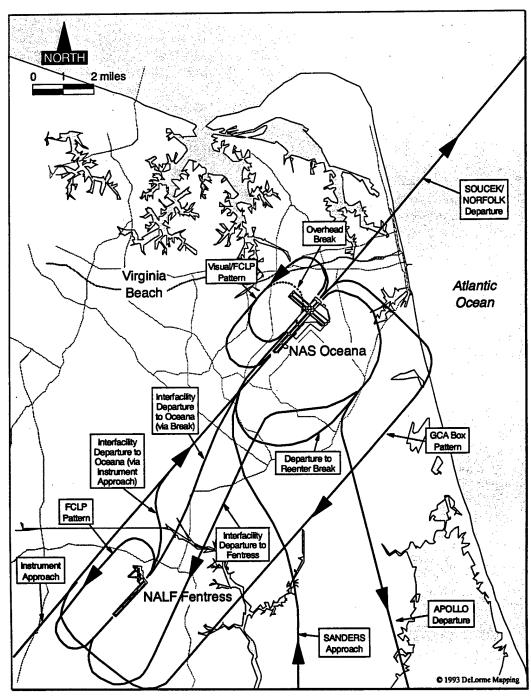


Figure 2-8: NAS Oceana Flight Tracks Modeled for Runway 5 Operations



The frequently used, published routes are:

APOLLO Departure: This standard departure follows the 175° NTU (NAS Oceana) Tactical Air Navigation (TACAN) radial. Aircraft departing the field climb to 1000 feet (altitudes in MSL) and maintain until clear of the VFR pattern. Aircraft then execute a right turn from Runways 5 and 14 and a left turn from Runways 23 and 32 to intercept the radial within four nautical miles (NM) of the TACAN. The left turn from Runway 32 should be made within two NM. Aircraft should climb above 11,000 feet within 38 miles along the radial. There are a number of transitions along this route for entry into W-72, the W-72 Tactical Aircrew Combat Training System (TACTS) range, R-5314 and the Navy Dare County Bombing Range, R-5313, Stumpy Point MOA, Pamlico MOA, and W-122.

SOUCEK Departure: Aircraft on this standard departure climb straight from Runway 5 or execute left turns above 3500 feet from Runways 14, 23, and 32 to intercept the 95° radial of the Norfolk International Airport Very High Frequency Omnidirectional Range Tactical Air Navigation (VORTAC) transmitter. Transitions take aircraft into W-386 and W-72.

NORFOLK Departure: Aircraft on this standard departure climb to 1500 feet while maintaining their runway heading. They are then given radar vectors to their appropriate transition or fix. A flight track to the SCHOL fix has been modeled for missions using the military training routes (MTRs) to the west.

SANDERS Approach: Aircraft on this standard approach intercept the 193° NTU TACAN radial within 29 NM at altitudes between 4500 feet and 6500 feet. When three NM from the airfield, they turn to fly the three-NM arc until they intercept the duty runway extended center-line, at which point they turn to enter the break or land.

<u>LIGHTSHIP Approach</u>: This standard approach is available only to runways 23 and 32. Aircraft on this approach intercept the 83° NTU TACAN radial within 16 NM at altitudes between 4500 feet and 6500 feet. When three NM from the airfield, they turn to fly the three-NM-radius arc until they intercept the duty runway extended center-line, at which point they turn to enter the break or land.

Two patterns are used at the NAS Oceana airfield for visual and instrument approach training. The visual pattern, also called the tower pattern, is a left-hand pattern in which aircraft conduct touch-and-go operations to Runway 5L. FCLP operations also use this pattern. Aircraft operate at 1000 feet AGL (above ground level) on the downwind leg of this pattern. ATC limits five aircraft to the tower pattern. Aircraft enter the visual pattern from the overhead break approach (most common), a straight-in visual approach, a transition from an instrument approach to Runway 5R, or directly after take-off. The instrument pattern, or GCA box pattern, is a right-hand pattern to Runway 5R. Instrument approaches involve shallower approach angles, hence a larger distance from an initial point to the



runway, than visual approaches. For modeling purposes, ATC personnel stated that a reasonable maximum number of aircraft in the GCA pattern at one time is eight aircraft.

The NALF Fentress pattern is designated as the airspace below 1000 feet and within 1¾ nautical miles from the center of the airfield. This auxiliary field is used only under VFR or Special VFR (SVFR) conditions. Interfacility departures from NAS Oceana to NALF Fentress use the following procedures:

NALF Fentress duty runway is 5: NAS Oceana Runway 5 and 14 departures execute right turns within 3 nautical miles to intercept the 201° (VFR) or 213° (SVFR) NTU TACAN radial. They follow the radial at or below 1500 feet (VFR) or as assigned (SVFR) to 11 nautical miles from the TACAN at which they execute a right hand turn and enter NALF Fentress pattern via the break at 1000 feet. NAS Oceana Runway 32 departures execute left turns within 3 nautical miles to intercept the 233° (VFR) or 213° (SVFR) NTU TACAN radial. They follow the radial at or below 1500 feet (VFR) or as assigned (SVFR) to 11 nautical miles from the TACAN at which they execute a left (VFR) or right (SVFR) hand turn and enter NALF Fentress pattern via the break at 1000 feet.

NALF Fentress duty runway is 23: All NAS Oceana departures execute turns within 3 nautical miles to intercept the 223° NTU TACAN radial. They follow the radial at or below 1500 feet (VFR) or as assigned (SVFR) and directly enter NALF Fentress pattern via the break at 1000 feet.

Interfacility departures from NALF Fentress to NAS Oceana use the following procedures:

NAS Oceana duty runway is 5: NALF Fentress departures proceed directly to NAS Oceana for a straight-in approach.

NAS Oceana duty runway is 14: NALF Fentress Runway 5 departures proceed directly to NAS Oceana and enter the downwind leg of the tower pattern. NALF Fentress Runway 23 departures turn left and proceed to NAS Oceana via the STUMPY LAKE fix and enter the base leg of the tower pattern.

NAS Oceana duty runway is 23: NALF Fentress departures turn right and proceed to NAS Oceana via the PUNGO fix and enter the downwind leg of the tower pattern.

NAS Oceana duty runway is 32: NALF Fentress Runway 5 departures turn right and proceed to NAS Oceana via the PUNGO fix and enter the base leg of the tower pattern. NALF Fentress Runway 23 departures turn left and proceed to NAS Oceana via the PUNGO fix and enter the downwind leg of the tower pattern.

The upwind leg of NALF Fentress visual or FCLP pattern is a maximum of 1.5 miles for Runway 5 and a minimum of 1.7 miles for Runway 23. The pattern



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altitude is 800 feet. Coordination by a landing signal officer (LSO) is required when more than one aircraft is in the pattern.

### 2.3.3 MCAS Cherry Point Airspace Description

The MCAS Cherry Point RATCF provides radar air traffic control services for airports and air traffic operations within Alert Area 530 (A-530), the Restricted Area 5306 complex (R-5306A, C, D, and E), and portions of Warning Area 122 (W-122) at-or-below 17,000 feet, and in other areas where altitudes and airspace structures are specified by letters of agreement. Figure 2-9 depicts the modeled approach control airspace boundaries and stratification. Air traffic control responsibilities for R-5313 and R-5314 are delegated by Washington ARTCC to FACSFAC VACAPES when these areas are in use by military units.

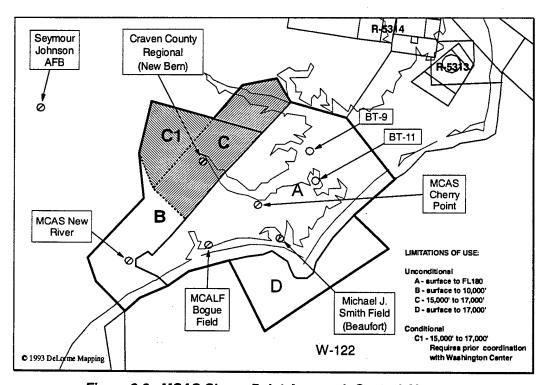


Figure 2-9: MCAS Cherry Point Approach Control Airspace

Since the commissioning of this study, a proposal has been made to modify the boundaries of the MCAS Cherry Point Approach Control Airspace by increasing the volume of airspace under the MCAS Cherry Point RATCF's control by approximately 300 percent, with lateral boundaries stretching to R-5314. Personnel at MCAS Cherry Point RATCF stated that the change will increase the quality of services (e.g., improved radar and radio coverage for several airports, improved traffic flow efficiency due to new airspace sectorization) provided to aircraft operating in the new airspace but will not have significant impacts on military and civilian traffic routings.



### 2.3.4 MCAS Cherry Point Routes and Patterns

The route and pattern structure at MCAS Cherry Point has similar elements as that of NAS Oceana. GCA, visual touch-and-go, and FCLP patterns, depart-and-reenter to the overhead break, overhead arrival, straight-in arrival, and departure routes exist. In addition, arrival routes to the AV-8 pads are modeled. The MCAS Cherry Point flight tracks are shown in Figure 2-10.

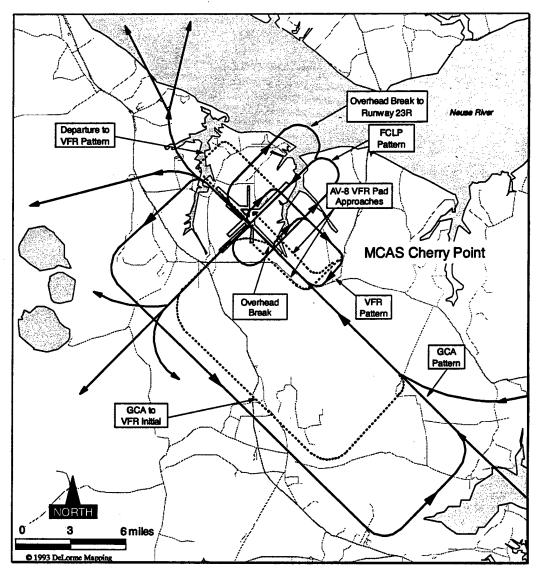


Figure 2-10: MCAS Cherry Point Flight Tracks Modeled for Runway 32 as the Primary Duty Runway

Analysts relied on data provided by MCAS Cherry Point-based ATC personnel and pilots to develop routes, speeds and altitude profiles to build representative profiles of arrival and departure flight paths, including nominal radar vector paths, within the terminal area. Flights arriving, departing, and operating within the studied airspace on published IFR routings are modeled in accordance with current en



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route and terminal separation standards. Unlike NAS Oceana, MCAS Cherry Point does not have published standard departure routes. Routings within the airspace that normally utilize VFR are modeled as published and as described by pilots and ATC personnel. The flight paths to and from the air station and local training areas are direct routings to fixes and transfer control points, which are established by MCAS Cherry Point ATC and other ATC facilities in the area. Several stereo routes are also available.

The tower traffic pattern for Runway 32L/R is right-handed at 1000 feet AGL. Overhead breaks are made at 1500 feet AGL. The GCA pattern is left-handed at 1500 feet AGL. For modeling purposes, nominal capacities for the tower and GCA patterns have been designated as six and nine aircraft, respectively. A maximum of six aircraft conducting touch-and-go operations in the tower pattern was determined by ATC personnel as a reasonable (average) maximum to be used in the model. In this runway plan, it is assumed that three pads for AV-8 V/STOL operations are utilized: north, south, and northeast pads.

When the tower pattern is busy (i.e., six aircraft are conducting visual touch-and-go operations), aircraft returning to base via the overhead break do so over Runway 32R to a right downwind leg for a full-stop, straight-in arrival to Runway 23R.

Carrier FCLP operations are performed on Runway 23R in a left-hand pattern at 600 feet AGL. No other operations at the airfield except departures and full-stop arrivals are permitted during the FCLP period. A maximum of six aircraft in the FCLP pattern is allowed, and up to four aircraft can operate in the automated carrier landing system (ACLS) pattern. Aircraft arriving at the airfield when FCLPs are in progress perform a straight-in full stop landing. Note that Navy F/A-18 FCLP operations are performed exclusively at MCAS Cherry Point and not at MCAS Bogue Field.

AV-8 squadrons also perform FCLP operations, but these operations consist of vertical landings on a painted carrier deck at MCALF Bogue Field, which has heat-resistant, aluminum matting for runway surfaces and can sustain the intense heat from an AV-8 aircraft's downward thrust during a vertical landing and departure. Occasionally, AV-8 fleet squadrons will conduct forward base operations (FBO) qualifications at MCAS Cherry Point instead of at MCALF Bogue Field. FBOs consist of rolling vertical landings and short field take-offs and, at MCAS Cherry Point, are performed on Taxiway Foxtrot. The FBOs on Taxiway Foxtrot prohibit FCLPs on Runway 23R.

# 2.3.4.1 Description of the Proposed Parallel Runway at MCAS Cherry Point

The following descriptions of the parallel runway and its potential effects on pattern operations and runway usage are preliminary. The parallel runway is proposed only in conjunction with the realignment of five Navy F/A-18 fleet squadrons to MCAS Cherry Point (ARS-5). The impetus for the addition of this runway is threefold: decrease the impact of carrier FCLP operations, decrease the



interactions between aircraft arriving and departing the airfield and those conducting pattern operations (resulting in reduced delays), and increase the capacity and efficiency of the airfield. The presentation of operational descriptions of the parallel runway focus on details necessary for the potential future implementation of the runway in the NASMOD model.

Runway 23L, the designation of the new runway, is (at least) 8000 feet in length and 400 feet wide with its centerline 1000 feet from Runway 23R. The current Runway 23L is renamed to Runway 23C and is still used for departures. Runway 23 (L/R/C) becomes the duty runway as well as the calm wind runway, which is currently Runway 32. Runway 32 remains the primary instrument runway. (Note that the approach weather minimums are low for Runway 23, but the lowest minimums are for approaches to Runway 32. Runway 32 also has better lighting, and its instrument approach path does not interfere with the restricted area (R-5306A) as does for the approach corridor for instrument arrivals to Runway 23.)

Taxiways connect Runways 23R and 23L at the approach end, midway, and at the centermat end of the runways. The Northeast Harrier pad (located east of Runway 23R) is no longer available. This pad will be replaced, but the exact location has yet to be determined. ATC personnel suggest that the new pad will be located to the west of Runway 23R such that the approach to this new pad will not interfere with the approaches to the North Harrier pad nor with operations at the rifle range.

During the Runway 23 plan, VFR touch-and-go operations are conducted on the new Runway 23L in a left-hand pattern. Approaches to the Harrier pads are performed from this pattern. Instrument approaches are made to Runway 23R. VFR full-stop arrivals from the tower pattern can be made to either Runway 23R or 23L, depending on traffic conditions. Full-stop arrivals from the tower pattern with mixed traffic (e.g., AV-8s with EA-6s or F/A-18s) are typically performed to Runway 23R.

FCLP operations are performed on Runway 23L in a left-hand pattern at 600 feet AGL (for F/A-18s). During FCLP operations, the tower pattern operations are shifted to Runway 23R in an "up and out" left-hand pattern that is at least 1100 feet AGL and wider and longer than the FCLP pattern. Instrument arrivals remain to Runway 23R. The South and Southeast Harrier pads are not available during FCLPs.

In the current model and under the Runway 32 plan in the parallel runway scenario, FCLP flights are centrally scheduled such that non-FCLP flights that desire to conduct pattern operations have their launch times adjusted in order to "avoid" returning to base during a FCLP period. Note that FCLP flights do not have a higher priority than flights that conduct normal pattern operations; FCLP and non-FCLP flights that have potentially overlapping pattern times are adjusted to avoid conflict. (It is a random selection for missions with equal priority for scheduling.) During the Runway 23 plan, on the other hand, FCLPs can occur on Runway 23L without taking away the ability for tower and instrument pattern operations. FCLP missions do not need to be scheduled centrally such that the



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launch times of non-FCLP flights might be adjusted. Also, FCLP missions will not be affected by normal pattern operations. As a consequence, we can expect the simulation to show that nighttime FCLPs will be scheduled earlier on average during the Runway 23 plan than during the other plans.

With the introduction of the parallel runway, runway utilization will be altered. Currently, Runway 32 is designated the calm wind runway, but after the addition of the new runway, Runway 23 becomes the calm wind runway. The calm wind condition, during which the wind is three knots or less, occurs about 15 percent of the time at MCAS Cherry Point. Table 2-2 shows the percentage of time that each runway is designated as the duty runway for the current airfield layout (from historical data) and for the parallel runway scenario (estimated).

Table 2-2: Percentage of Time Runways at MCAS Cherry Point Designated as Duty Runway

Runway	Current airfield layout	With parallel runway (est.)
23	33%	48%
32	43%	28%
14	9%	9%
5	15%	15%

## 2.4 Training Areas

The training areas analyzed in this study are those used primarily by military units in the MCAS Cherry Point and NAS Oceana region. Table 2-3 lists the training areas in which demand from all users is modeled.

Table 2-3: Training Areas with Fully Modeled Demand

Training Area	Scheduling Notes and Comments
W-72 TACTS range	Scheduled exclusive-use for activities requiring TACTS instrumentation.
R-5314/ Navy Dare County	Primarily scheduled for exclusive-use activities.
Phelps MOA	Located above R-5314. Scheduled in conjunction with high-altitude air-to-ground missions at R-5314. (Not yet approved special use airspace)
BT-11	Target scheduled exclusive-use.
BT-9	Target scheduled exclusive-use.
R-5306A	Operations conducted exclusively outside of BT-9 and BT-11. Can be scheduled exclusive- use for exercises.
W-72	Primarily scheduled for concurrent-use activities. W-72 statistics do not include TACTS range activity.
W-386A/B	Concurrent-use airspace. Primarily used by Langly AFB units in exclusive-use sub-areas.
W–386D	Primarily used as an air-to-air gunnery range.
W-122	Concurrent-use airspace MCAS Cherry Point, Seymour Johnson AFB, and Pope AFB units.



The training areas analyzed with the demands of only NAS Oceana and MCAS Cherry Point tenant squadrons include R-5306D, military training routes, the Fort Picket range, and the Stumpy Point Range (R-5313). The reported annual utilization for each area is categorized by user.

The internal boundaries of the warning areas administered by FACSFAC VACAPES (i.e., W-122, W-386, W-72, W-108) were modified to incorporate special operating areas (SOAs) after the design of this study. Subareas A, B, and D of W-386 no longer exist. The SOAs provide users the ability to schedule subareas within the warning areas exclusively. The alteration to operations, capacity, and utilization of these warning areas is not addressed in this study but may be studied in future analyses.

The following sections give key scheduling and operational assumptions for the training areas.

## 2.4.1 W-72 TACTS Range

The W-72 Tactical Aircrew Combat Training System (TACTS) range lies in the southwest region of W-72A and has published operating hours on weekdays of 0700–1800 during the summer and 0700–1700 during the winter. At other times and during weekends, the TACTS range can be scheduled on an overtime basis. This system permits the tracking and recording of the position and attitude of aircraft equipped with TACTS instrumentation while on the range. The system is primarily used to enhance the effectiveness of air-to-air combat training. Normally, only one event at a time is scheduled in the TACTS range due to limited airspace. Several aircraft can participate in the event (up to 36 aircraft at one time). The range can also be scheduled as "area only" for events that do not employ the TACTS instrumentation.

This range is scheduled in 30-minute blocks by the Navy Fighter Wing One, Atlantic.

## 2.4.2 Navy Dare County Range and Phelps MOA

The Navy Dare County Range is situated within the northern half of R-5314 and is scheduled on an exclusive-use basis for a variety of mission types, most of which are related to air-to-ground training. The southern half of R-5314 contains a similar range administered by the Air Force. This analysis addresses only the Navy Dare Range (i.e., northern half of R-5314). This range is available 0800–2400 Monday through Thursday and 0800–1600 Friday and Saturday. It is available at other times and on Sunday with special prior scheduling. Priority is given to Navy units Monday through Friday and Virginia Air National Guard units on Saturday.

The Phelps MOA is designed to be utilized in conjunction with high-altitude air-to-ground missions at R-5314, providing ingress airspace. The MOA, along with an Air Traffic Control Assigned Airspace (ATCAA) extension, "fills in" the airspace between Hatteras B ATCAA and R-5314, as depicted in Figure 2-11. By letter of



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agreement with FAA, the MOA can only be used as part of high-altitude bombing exercises in R-5314. Military aircraft avoid using the area for training that does not require a high-altitude ingress to the Dare County Range. The Phelps MOA is currently not an approved special use airspace (SUA), but for the purposes of this study, the airspace is assumed to be designated SUA.

This range is scheduled in 15-minute blocks by FACSFAC VACAPES.

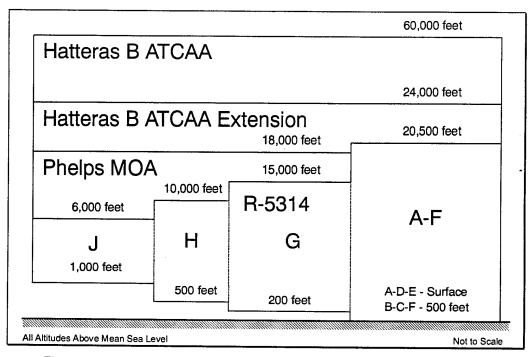


Figure 2-11: Schematic of Dare County Airspace (looking to the north)

### 2.4.3 BT-9 and BT-11

The BT-9 Brant Shoals Target and the BT-11 Piney Island Range are located within R-5306A. These targets are manned 0800–2300 Monday through Thursday and 0800–1500 Friday and are used for air-to-ground training. After-hours and weekend utilization is not modeled, except during special exercises such as JTFEX. These targets are scheduled in 20-minute blocks by MCAS Cherry Point Central Scheduling. Exercises have first priority, and all other users have equal scheduling priority.

### 2.4.4 R-5306A

Located to the north of MCAS Cherry Point, this restricted airspace is approximately 30 NM by 30 NM in size with altitudes surface to 17,999 feet MSL and contains bombing targets BT-9 and BT-11. Many of the flights that enter R-5306A are ultimately destined for these targets.



Other users of R-5306A conduct a wide variety of missions within the airspace. Missions utilizing the Cherry Point TACTS and Mid-Atlantic Electronic Warfare Range (MAEWR) that are not scheduling BT-9 or BT-11 have increased in number over the last few years. Also, various aircraft perform low-altitude training (LAT) along a course within the restricted airspace, and helicopters train at OLF Atlantic, an unmanned airfield in the southeast corner of R-5306A.

Currently, airspace managers place no restriction to the number of flights, each of which can contain any number of aircraft, allowed into R-5306A at one time. The capacity of BT-11 and BT-9 is more clearly defined since those training areas are scheduled exclusive-use. The capacity of concurrent-use airspace is based upon the pilots' comfort levels, which are directly related to the type of flights that are being conducted within the restricted airspace. Pilots suggested that a realistic limit to the number of flights inside R-5306A, exclusive of BT-11 or BT-9, is four, including aircraft on the LAT course but not including helicopters at OLF Atlantic. This assumption is not applied to exercises that schedule R-5306A exclusively.

R-5306A is scheduled by MCAS Cherry Point Central Scheduling.

### 2.4.5 R-5306D

Located within the Marine Corps Base (MCB) Camp Lejeune Complex and approximately 25 nautical miles to the south of MCAS Cherry Point, R-5306D is utilized by fixed-wing squadrons during close-air-support missions at Golf 10 (G-10) impact area, forward base operations at Lyman Road, and other missions involving troop support.

This restricted area is scheduled by MCB Camp Lejeune Range Control.

### 2.4.6 W-72

For the purpose of this analysis, W-72 is considered as the entire region of W-72A/B excluding the area associated with the TACTS range. This is because the W-72 airspace outside the TACTS range is used primarily on a concurrent-use basis while the TACTS range is scheduled on an exclusive-use basis. Most missions use W-72 concurrently, and during such times there is no limit imposed on the number of simultaneous missions or sorties. FACSFAC VACAPES informs missions wishing to use W-72 of the current state of the airspace (e.g., number of aircraft currently present) and can suggest possible available blocks of unused airspace within W-72. The airspace can be scheduled exclusive-use for special events (e.g., live missile fire). During such activities, the entire airspace, including the TACTS range, is reserved exclusively for the aircraft participating in the event.

### 2.4.7 W-386A/B

These two subareas of W-386 are situated to the northeast of NAS Oceana. Air Force and Air National Guard units have a higher priority for exclusive-use



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utilization of this airspace than the Navy. Missile launches from NASA Wallops Flight Facility have highest priority.

This airspace is administered by FACSFAC VACAPES and is scheduled by the Air Force Air Combat Command, First Fighter Wing.

### 2.4.8 W-386D

This subarea of W-386 is situated along the southeast edge of W-386A. While the Air Force has a higher scheduling priority for this airspace, they do not use this area due to its limited size. The Navy uses this airspace primarily for air-to-air gunnery training.

This airspace is administered and scheduled by FACSFAC VACAPES.

### 2.4.9 W-122

Like W-72, most missions use W-122 concurrently, and there is no limit imposed on the number of simultaneous missions or sorties. FACSFAC VACAPES performs the same services for W-122 users as for W-72 users. Portions of this large airspace can also be scheduled for exclusive-use for special events (e.g., live missile fire).

### 2.4.10 Military Training Routes

These are a collection of visual (VR) and instrument routes (IR) that are used by NAS Oceana and MCAS Cherry Point-based squadrons. Historically, the most commonly used routes at NAS Oceana have been VRs 1752, 1753, 1754, 1755, and 1758. Cherry Point Central Scheduling provides scheduling of four VR routes and one IR route: VRs 1040, 1041, 1043, 1046, and IR 23. VRs 1043 and 1046 terminate at R-5306A, and all of these routes lie to the south and east of MCAS Cherry Point. Combined historical utilization of the four Cherry Point VR routes is approximately 1400 sorties annually.

The MTRs are administered by a variety of agencies. This study only addresses the demand on the MTRs by NAS Oceana and MCAS Cherry Point squadrons.

## 2.4.11 Fort Pickett Range

The U.S. Army's Fort Pickett Range is adjacent to Fort Pickett, Virginia, and is about 90 nautical miles to the west of NAS Oceana. The range is composed of three restricted areas, R-6602A/B/C, and three MOAs, Pickett 1, Pickett 2, and Pickett 3, and is utilized by the Navy for F-14 and F/A-18 squadrons' close-air-support missions.

This range is scheduled by the Fort Pickett Directorate of Plans, Training, and Mobilization. Only NAS Oceana demand on this range is addressed in this study.



### 2.4.12 Stumpy Point Range

The Stumpy Point Range is located about 80 nautical miles south of NAS Oceana (75 miles north of MCAS Cherry Point) in Pamlico Sound. The range is composed of R-5313A/B and a target, which consists of a sunken landing ship tank that once measured 315 feet by 50-feet, but now is broken in several pieces. The target is scored, and only inert bombs and training rockets are authorized.

This range is scheduled by FACSFAC VACAPES.

## 2.4.13 The Proposed Core and Cherry 1 MOAs

This description of the Core and Cherry 1 MOAs is presented to inform the reader about the proposed MOAs, but these training areas are not included in this NASMOD study.

First proposed by the Marine Corps in 1985, the Core and Cherry 1 MOAs are adjacent to the southeast and northwest sides of R-5306A, respectively, as shown in Figure 2-12.

The establishment of the Core MOA will enable realistic tactical ingresses to R-5306A from the ocean (W-122) by permitting AV-8, F-14, F/A-18, and other military aircraft conducting strike, close-air-support, and other air-to-ground missions to operate at speeds in excess of 250 knots at altitudes below 10,000 feet MSL.

The establishment of the Cherry 1 MOA will significantly increase the overland training area in proximity to the BT-11, BT-9, and the MAEWR, which will provide flexibility in training locations and extend training opportunities. This MOA will provide protected airspace for tactical ingress and egress of overland strikes to targets within R-5306A. When not utilized for tactical training, the Cherry 1 MOA can relieve R-5306A demand of missions not requiring designated restricted airspace, such as familiarization flights.

The Core and Cherry 1 MOAs' descriptions, location process, and impacts on the local communities and environment are presented in the 1987 Draft Environmental Impact Statement for Establishment of Cherry 1 and Core Military Operating Areas.



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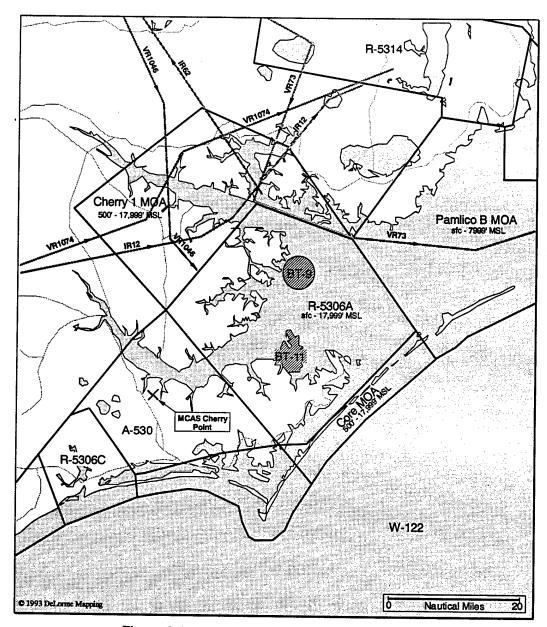


Figure 2-12: Proposed Core and Cherry 1 MOAs

## 2.5 Squadron Operations

Squadrons and their training operations are modeled using a diverse set of variables and characteristics. These include the number and type of units expected to reside at NAS Oceana and MCAS Cherry Point following the implementation of the BRAC 95 decisions, definition of the deployment and training cycles each unit follows, and descriptions of the types of missions and number of activities and operations performed during the defined training cycles.



### 2.5.1 Navy Fleet Squadron Operations

For the purpose of this study, Navy fleet squadrons are operational squadrons that deploy as part of a carrier airwing (CVW). This nomenclature distinguishes such Navy squadrons from other operational units, such as training and adversary squadrons, which do not perform carrier deployments. In this study, three types of Navy fleet squadrons are modeled: F-14 Fleet (Atlantic), F-14 Fleet (Pacific), and F/A-18 Fleet (Atlantic).

## 2.5.1.1 Workup Cycle Description

All of the fleet squadrons perform a sequence of training exercises to prepare for carrier deployment. These workups follow the pattern shown in Figure 2-13. There are approximately eighteen months of training prior to deployment followed by six months of deployed carrier operations. After a squadron returns from deployment, it recommences workups for its next deployment. These nominal cycles were developed in consultation with personnel from Naval Air Forces, Atlantic (AIRLANT), and Naval Air Forces, Pacific (AIRPAC), and are idealized schedules of milestones. In practice, squadrons rarely follow precisely these cycle since many of the factors that govern the schedule of carrier deployments, particularly overseas political and military commitments, can change rapidly.

During the eighteen-month workup period, a typical fleet squadron trains at its home air station and away on temporary detachments or at-sea exercises. The first month after return from deployment is generally a standdown period during which little flying is done and many squadron personnel take leave. A few aircraft may be reassigned to other squadrons that are closer to their deployment dates.

For the first six months of the workup, the training activities tend to be at the unit level. New and replacement aircrews are assigned to squadrons during these months or as early in the workup as possible. A strike/fighter detachment (S/F Det) may occur around the third month, consisting of approximately five aircraft and ten aircrews. A period of carrier qualifications (CQ) often occurs during the fifth month with an emphasis on getting the newer aircrews qualified. Another detachment, called Orange Air for Atlantic fleet squadrons, occurs during the sixth month. This may involve about 80 percent of the squadron in air-to-ground (A/G) training or as aggressors in training exercises with other, embarked squadrons.



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AIRLANT Workup	2   3   4   5   6   7   6   9   10   11   12   13   14   15   16   17   16	2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   17   18   19   19   19   19   19   19   19	Air-to-Ground detachment  Carrier Qualifications (embarked)  Carrier air wing detachment at NAS Fallon  Joint Training Fleet Exercise, carrier air wing exercises (embarked)  Alta Det  Alta Det  Alta Det  Alta Det  Alta Carrier air wing detachment, adversarial support for carrier-based exercises (variety of locations, e.g., NAS Roosevelt Roads)  Strike fighter detachment advanced readiness program detachment (dashed portion of box indicates that squadrons perform first part of this training at home)  Tailored Ship Training Availability, three parts, carrier air wing exercises (embarked)  Competitive Training Unit Exercise, two phases, carrier air wing exercises (embarked)
			A/G Det CO CVW Det JTFEX Overinge Air A/G Det S/F Det SFARP TSTA C2X

Figure 2-13: Navy Fleet Nominal Workup Cycles



Squadron operations through the next six months tend to incorporate greater levels of joint training with sister squadrons (i.e., other squadrons assigned to the same airwing). Squadrons may send some aircrews to support sea trials, which are dedicated primarily for the training of aircraft carrier and other ship-based personnel. Typically performed close to the first airwing exercise, SFARP is an intensive period of air combat training supported by adversary squadrons. For the first two and one-half weeks, Atlantic and Pacific fleet squadrons perform the air-to-air portion of SFARP locally in the TACTS range. The final week, the air-to-ground phase, is performed on detachment, frequently at NAS Fallon. Around the twelfth month, the entire airwing embarks for a series of Tailored Ship Training Availability (TSTA), during which they conduct joint training operations and coordinated activities at sea.

The remaining six months consist of increasing amounts of wing-level training during three large exercises. The carrier airwing detachment to NAS Fallon is three weeks long, consisting primarily of air-to-air and air-to-ground training. The TSTA III and Competitive Training Unit Exercise (C2X) are more at-sea exercises, which culminate with the Joint Training Fleet Exercise (JTFEX). Following successful completion of JTFEX, the carrier battlegroup is ready for deployment. During the final month before deployment, the squadrons' aircrews conduct local flights in the core mission types, perform maintenance flights and FCLP training, and take personal leave.

## 2.5.1.2 Airwing Deployment Cycles

Figure 2-14 depicts the workup, detachment, and deployment timeline assumed for NAS Oceana-based squadrons during a hypothetical future year after implementation of the BRAC 95-related decisions. The timeline is based on data provided by AIRLANT and AIRPAC. As discussed in the previous section, each carrier airwing participates in six-month deployments that are preceded (i.e., separated) by eighteen-month workup intervals. The carrier airwing deployments are staggered by about five months. A fifth Pacific fleet carrier airwing is based in Japan and does not have a significant effect on the operations at NAS Oceana and MCAS Cherry Point; consequently, it is not shown in the figure. This fifth airwing is on deployment from February to July.



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				S/F	7	1			CVW			1		C2X (Phase 2)/ JTFEX	35			
	020						A III		ISTA M 16	TSTA IM	?			<b>-</b>		15	VACAPES	Jacksonville Virginia Capes
	SILE	Orange Air	17			DEPLOYMENT	TSTA III	- 25			A/G Pet	DE-KOWIEKT ***		C2X (Phase 1)	5			JAX J. VACAPES V. VACAPES V. iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii
	E.	g	4			DEPLOYABITA	No.		SFARP 16 12	SFARP 16 12	8 4			-[6]			VACAPES OPAREA	V V V H Roads)
Je	NO.			The state of the s			CVW	21	Sea Triais 3			2)[		CVW Det		8	VACAPES	, NAS Raosevel
arrier Air Wing Deployment Timeline	MAY	S/F	7			MEX.	TSTA	- <del>8</del>			2 Pet	CZX (Phase 2)/ JTFEX	32	ISTA MI		ی	VACAPES OPAREA	NAS Oceana. The numbers under each box denote the durations of the detachments.  JAX Alri-to-Canual distachment Carrier Graund destachment Carrier Qualifications (embarked) Carrier distachment at NAS Fallon Joint Trainling Fleet Exercise, carrier air wing exercises (embarked) Joint Trainling Fleet Exercise, carrier air wing exercises (embarked) Alri-to-Graund destachment, adversarial support for carrier-based exercises (variety of locations, e.g., NAS Roosevelt Roads) Strike fighter advanced readiness program detachment (dashed portion of box indicates that squadrons perform first part of this training at home) Tailored Ship Training Unit Exercise, two phases, carrier air wing exercises (embarked)
vment	APR			Section of the second		42	Miles Street					() eg					OPAREA	its. The numbers under each box denote the durations of the detachments, and detachment detachment (and detachment (and detachment) (and detachment et NAS Fallon) (ing detachment at NAS Fallon) (ing detachment, adversarial support for carrier-based exercises (variety of locatic detachment, adversarial support for carrier-based by the carrier of detachment of adversarial support for carrier and proving the position of box indicates the redvanced readiness program detachment (dashed portion of box indicates the praining Availability, three parts, carrier air wing exercises (embarked) Training Unit Exercise, two phases, carrier air wing exercises (embarked)
Deploy	MAR					C2X (Phase 1.8.2)		18 12	Orange Air A/G Det 17	A/G Det		TSTA III/ C2X (Phase 1)	36	SFAHP 16 12		14	OPAREA	note the duratic cises (embarked carrier-based ex iment (dashed po rier air wing exer
Wing	FEB						Sea Trials	6	© 4 §	<u>QQ</u>		2 E		· · · · · · · · · · · · · · · · · · ·				der each box de AS Fallon ier air wing exer sarial support for program detach three parts, car three parts, car
ier Air	JAN				CVAN	24 Par						rA Cvw	16 21			16 H	OPAREA	is. The numbers under each in detachment detachment detachment at NAS Fallon detachment at NAS Fallon of detachment, adversarial support detachment. Adversarial support detachment adversarial support advanced readiness program of Tarlaing Availability, three par Training Unit Exercise, two physical programs of the part of the pa
Carr	DEC			Хаш	ZO	16 16			S/F Det 7	S/F Det	A Deposit of the second	TST				9 X	OPAREA	NAS Oceana. The numbers under each box denote the duration Art-to-Ground detachment at NAS Fallon Carrier ali wing detachment at NAS Fallon Carrier ali wing detachment at NAS Fallon Joint Training Fleet Exercise, carrier ali wing exercises (embarked) Air-to-Ground detachment, adversarial support for carrier-based existive fighter detachment. Strike fighter datachment Strike fighter advanced readiness program detachment (dashed por Tailored Ship Training Availability, three parts, carrier air wing exercises the program detachment and page of Tailored Ship Training Unit Exercise, two phases, carrier air wing exercises.
	NOV			81 & 2)			Orange Air AG Det	42					<u> </u>	(1)			OPAPEA	d away from
	ОСТ			CZX (Phase 1 & 2)	7e	16 12	8	*				SFARP	-11	8 8 •			OPAREA 0	Boxed events are performed away from IAS Ocean Air-Do-Groun CQ CA CARIFEX CARIFEX CARIFF (CARIFF (CARI
	CVW		<b>4</b>	<b>m</b>	Œ	<b>3</b>	d Z			Ą	_ œ	<b>Ū</b> <	( (	ني ن	CARRIER AVAILABILITY FOR	FRS CQ		NOTE: BOXEG EVENTS ARE DAG DEL CO CO COVER DEL

Figure 2-14: Deployment Timeline for NAS Oceana-based Squadrons



The NASMOD simulation for this study is performed for a twelve-month period chosen such that the overlap of the deployment schedules results in an average loading of local flights at NAS Oceana. The contribution of local operations by different airwings varies considerably; however, simulating twelve months permits an analysis of the aggregate affects of the overlap of the deployment cycles. An additional benefit of simulating a full twelve months is that the effects of weather and other calendar-dependent events (e.g., holidays, sunrise/sunset time variation) can be observed.

## 2.5.1.3 Navy Fleet Squadron Training Requirements

Training requirements are the NASMOD data inputs for modeling the varying levels of training that each squadron type performs during its workup cycle. The training and readiness (T&R) matrices for each type of aircraft (e.g., F-14, F/A-18) were reviewed and the various flights were aggregated into mission types. The analysts and pilots then arranged the mission types into a frequency matrix. Using T&R currency and Navy flight hour funding guidelines, determinations were made as to the frequency of individual mission types during each month of the workup cycle. Each squadron's monthly mission allocations were adjusted across the turnaround cycle to ensure that an appropriate number of missions of each type are being flown during the workup cycle. The total number of monthly sorties and flight hours were also calculated to verify the month-by-month training levels. Finally, the portion of the total hours that is flown locally (i.e., to/from NAS Oceana or MCAS Cherry Point and excluding detachments and at-sea training) for each mission type was determined. Examples of monthly allocations of at-home Atlantic F-14 and F/A-18 fleet squadron sorties during a workup cycle are shown in Table 2-4 and Table 2-5, respectively.

For most mission types, a fleet squadron attempts to complete the allocated number of sorties for that type on any day during the month. However, FCLP training is designed to prepare pilots for carrier landings and, consequently, are performed as late as possible before an at-sea period to ensure that pilots' skills are current. For this study, all FCLPs allocated for a specific month of workup are restricted to the two-week period starting sixteen days prior to the next at-sea period. During this time, FCLP flights have scheduling priority within the squadron. With this plan, two free days after the last FCLP is performed provide time for the squadron to embark the carrier.



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Table 2-4: Monthly Squadron Local Sortie Allocations by Mission Type during a Nominal F-14 Fleet Squadron Workup

				F B S		g <del>-1</del>	Orange Air A/G Det				SFARP			D CW		TSTA 2X (Phas		JIFEX	Deploy	À
MISSION TYPE	Mours Workup per Flight	-	2		4	<b>"</b>		_		6	\$	=	12	5	<del>1</del>	15	<b>4</b>	<b>≜</b>	\$	TOTAL
Air Combat Maneuvers 1 v 1	4.0	9	9		12	∞	4	16	9	15	<u></u>	12	4		\$2		9	2	r.	141
Air Combat Maneuvers 2 v 2	1.5	9	9	4	•		7	91	20	81	20	18	2		18		7	2	- - - - -	188
Air Combat Maneuvers 2 v X	1.6	4	80	ဇ	4		60		15	12	22	18	2		4		2	2	- 0	127
Air Combat Maneuvers 4 v X	9.6	4	<b>6</b> 0		4			4	ro.	2	18	4	2		5		2		. 60	71
Air Combat Tactics	90	12	12	18	12					4	91	4		-						78
Air Intercept Combat		ဖ	ဖ	9	ø	24	80	16	t t	9	18	5	2		7		80	6	01	153
Close Air Support	<b>*</b>		4	2			5	2	8	2			4	5				2	1	69
Electronic Warfare	90		4	4	4	4		4	8		4	80	12	ro				!	:	. 69
Forward Air Control	*		4	4	9	4	12	2	6	15	80	4	12		2			5		87
Functional Check Flight	<b>4.</b>	80	9	4	5	4	မ	12	19	15	15	5			5				. 5	143
Field Carrier Landing Practice	1.0					48				80			100		8		-	72	. 08	470
Bombing, Live	2							4						-			-		!	4
Bombing, Inert	9.		12	80						25	4	12	2		15		4	4	50 .	109
Air-to-Air Gunnery					5				rc.				2	1	5					90
Air-to-Ground Strafe			2	3	9	4	2	5	5	rc.	r.	-	2	2	4	1	7	4		62
Low Altitude Training					9	80	5			20	-	4			2		į į	:	:	20
Low Level Navigation	2.0	80	9			g	င္က	15	ę	15	2	မှ	<u> </u>		80		-			=
Low Level Reconnaissance	<b>8</b> .	12			9			ဖ		2					5			: :	. 9	45
Missile Shot	<b>y</b>						ဖ					12					-			8
Strike		∞	81	80	12			80				4	<u>                                       </u>		16			7		. 92
Weapons Air-to-Ground		20	12				5	91	'n	5		8		2					: e	96
TOTAL L	TOTAL LOCAL SORTIES	2	128	2	106	110	118	131	149	249	150	139	158	19	234	0	2	124	194	2196
										1				1	1		1	1	1	]



Table 2-5: Monthly Squadron Local Sortie Allocations by Mission Type during a Nominal F/A-18 Fleet Squadron Workup

				S. T.			Orange Air A/G Det		8,5		<b>1</b> &	1 12	1	CVW Det V	C2X (P	TSTA III/ C2X (Phase 1 & 2)	) JTFEX		Deploy
	Month of			•	T		<b>\$</b> _	-	-	Ÿ├	▲├	-	Ă⊢	. L	<b>▼</b>  -		<b>▼</b>  _	1	
MISSION LYPE	Per Flight	-	2	en	•	90	6		<b>&amp;</b>	9	10 1	11 1:	12 13	2 2	15	16	1	<del>6</del>	TOTAL
Similar Air Combat Training 1 v 1		17	8		17			10 1	10 1	17 8	8	8	12 6	#	_	8	5	2	195
Similar Air Combat Training 2 v 2		10	20	12	24	5	<b>€</b>	10 2	20	16	2	24 1	10	18		4	2	20	236
Dissimilar Air Combat Training 1 v 1	1.2				56	5		16	60	e -	8	8	-	5	_			ဖ	114
Dissimilar Air Combat Training 2 v X	71	5	17		16	4		8	18	6	8	9		8				g	155
Dissimilar Air Combat Training 4 v X	1.2		11					8	60	4	64	4		85					92
Dissimilar Air Combat Training 8 v X										8	4	_	<u> </u>		_				34
Air Intercept Combat, Night Vision Goggles			21	17	4	16	4	8	12 1	12	<b>6</b> 0	8	80	<b>2</b>			2	20	194
Close Air Support	9					9		12	12		-	5		15					8
Multi-Sensor Integration			11	11	4	5	91	8	1	12	8	8	8 10	18	_		9	20	196
Precision Guided Munitions	91		o			15			80		_	9				ļ	<u> </u>	-	42
Functional Check Flight		4	9	5	∞	φ	80	8	5	5	5	5	10	5		•	5	9	154
Field Carrier Landing Practice	12					8				76		<b>о</b>	92	85			55	2	4
Air-to-Ground	45	4	9	4	80	ဖ	7	5	9	80		80	4	5		7	i 	4	. 83
Bombing, High-High			17		5	4		80	80		-	2		8			<u> </u>		87
Bombing, Live Heavy Drop						5													9
Air-to-Air Gunnery									16								<u>.</u>		92
Air-to-Air Competitive Exercise											<u>۾</u>	30							, 8
Mining Exercise								-	4					-					<b>4</b>
Low Level / Bombing, Day		9	8	4	12	9	4	10 1	10 1	12 ,	4	14	2	4		2	4	. 7	
Low Level / Bombing, Night Vision Goggles	9.	4	4		ω	4		8	4			4		4		2		4	9
Missile Shot	1.6				-						-	12			-				. 4
Strike	•			4	4	4	4	8	9	8		4	4	91			4	16	82
Air-to-Ground Competitive Exercise	1.6				17	17											:		8
TOTAL LC	TOTAL LOCAL SORTIES	69	186	89	178	212	66 1	132 18	180 1	181 176		184 15	153 40	285	o s	26	113	194	2433
								l			l								



### 2.5.1.4 F-14 Fleet Squadrons

There are eleven F-14 fleet squadrons based at NAS Oceana in the baseline scenario. These are composed of seven Atlantic fleet and four Pacific fleet squadrons. Squadron compositions are shown in Table 2-6. Many squadrons begin their workup with fewer than their full complement of aircrews and aircraft; however, as their deployment date gets closer, the squadrons are usually brought up to full strength. Typically, only ten aircraft per squadron are mission capable on a given day.

Squadron Type	Number of Squadrons	Aircraft per Squadron	Aircrew per Squadron
F-14 Fleet (Atlantic)	3	14	18
F-14 Fleet (Atlantic)	4	13	17
F-14 Fleet (Pacific)	4	14	18

Table 2-6: F-14 Fleet Squadron Compositions

The squadrons typically work Monday through Friday; however, weekends are utilized to catch up on incomplete training due to unforeseen events, such as bad weather and equipment failures. Cross-country flights and detachment transits are often (or primarily) flown during the weekend. The F-14 fleet squadrons occupy Hangars 500, 404, and 200 in the western-facing ramp area at NAS Oceana.

### 2.5.1.5 F/A-18 Fleet

All F/A-18 squadrons are assumed to be similar in composition and workup schedule. Each squadron is assumed to have 17 aircrews and 12 aircraft; however, on average only nine aircraft are mission capable on a given day.

Like the F-14 squadrons, the F/A-18 squadrons typically work Monday through Friday with "catch-up" training, cross-country flights, and detachment transits flown primarily on weekends. The F/A-18 fleet squadrons occupy Hangars 111 and 122 in the eastern-facing ramp area at NAS Oceana. At MCAS Cherry Point, they occupy Hangars 1665W, 131S, and 1700E as well as additional ramp space adjacent to Hangar 130 for ARS-5.

## 2.5.1.6 Navy Squadron Airwing Assignments

An important component of a squadron's impact over the course of a year on its home air station and the local training areas is its airwing assignment. After proposed carrier deployment cycles were determined by AIRLANT personnel and ATAC analysts, the composition of each airwing for each scenario was carefully selected in order to have an *average* impact over the year on NAS Oceana, MCAS Cherry Point, and the local training areas. Table 2-7 presents the Atlantic Fleet airwings' composition of Navy F-14 and F/A-18 squadrons for the alternative



scenarios. Since the model is capturing a one-year "snapshot" of operations, some wings have a greater influence on local operations than others. To maintain an average impact on NAS Oceana and to introduce an average Navy F/A-18 impact on MCAS Cherry Point, it was necessary to modify the F/A-18 squadron contribution to Wing C and Wing E for ARS-3. Appendix C contains further discussion of this modeling approach.

Table 2-7: Atlantic Fleet Airwing Assignments for F-14 and F/A-18 Squadrons for the Alternative Scenarios

	Squadron	Win	g A	Win	g B	Win	g C	Win	g D	Win	g E	То	tal
	Location	F/A-18	_	F/A-18	F-14	F/A-18		F/A-18		F/A-18	F-14	F/A-18	F-14
ARS-1	NAS Oceana	2	2	2	1	2	1	2	2	3	1	11	7
	MCAS Cherry Point											0	
	MCAS Beaufort											0	
ARS-2	NAS Oceana	2	2	2	1		1	2	2	3	1	9	7
	MCAS Cherry Point			A								0	
	MCAS Beaufort					2				100000000000000000000000000000000000000		2	
ARS-3	NAS Oceana	2	2	2	1		1	2	2	2	1	8	
	MCAS Cherry Point					3						3	
	MCAS Beaufort											0	
ARS-4	NAS Oceana		2	2	1		1	2	2	2	1	6	
	MCAS Cherry Point											0	
	MCAS Beaufort	2				3						- 5	
ARS-5	NAS Oceana		2	2	1		1	2	2	2	1	6	7_
	MCAS Cherry Point	2				3						5	
	MCAS Beaufort											0	

## 2.5.2 Marine Corps Fleet Squadron Operations

There are three distinct types of Marine Corps fleet squadrons based at MCAS Cherry Point: AV-8, EA-6B, and KC-130. Each type follows a very different timeline or work cycle, which is described in the following subsections.

## 2.5.2.1 AV-8 Fleet Squadrons

There are three AV-8 fleet (or "gun") squadrons with 20 aircraft and 28 pilots each. These squadrons follow a repeating, 15-month cycle, as shown in Figure 2-15. Like a Navy fleet squadron, AV-8 fleet squadrons participate in a number of detachments and exercises. In addition, each squadron supports a Marine Expeditionary Unit (MEU) deployment with six aircraft and ten pilots. AV-8 sortie allocations were developed following the method described for the Navy fleet squadrons. The simulated calendar year timeline is given in Figure 2-16 and shows the overlap of each AV-8 squadron's work cycle. The squadrons typically work Monday through Friday; however, weekends are utilized to catch up on incomplete training due to unforeseen events, such as bad weather and equipment failures.



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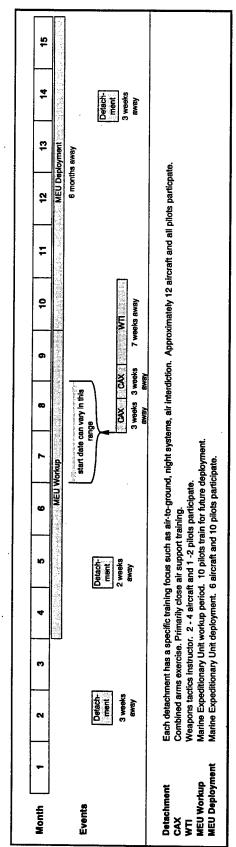


Figure 2-15: AV-8 Fleet Squadron Nominal Workup Cycle

Squadron	OCT	NOV	DEC	JAN	FEB	MAR	APR	МАУ	NOS	JUL	AUG	SEP	
	MEU Deployment	loyment						MEU Workup	/orkup			MEU Deployment	yoyment
•	6 months	oths										6 mc	6 months
-	ment			Detach			Detach				CAX	19 34 34	WI
	2 weeks			3 weeks	_		2 weeks		•		3 weeks 3 weeks		7 weeks
	MEU Workup			MEU Deployment	loyment								
				6 months	ths								
7	LIM.	•				Detach-			Detach-			Detach-	
	7 weeks					3 weeks			3 weeks		,	3 weeks	
	Section of the section of		MEU W	MEU Workup					MEU Deployment	Moyment			
o,		Detach- ment 2 weeks	- <b>L L</b>	CAX CAX	7	WTI			6 months	nths	Detach- ment		
										,			

Figure 2-16: AV-8 Fleet Squadrons' Timeline



The AV-8 fleet squadrons occupy Hangars 1666N, 1666S, and 1664N. They primarily use the fuel pits located to the east of their hangars, along Taxiway Bravo.

### 2.5.2.2 EA-6B Fleet Squadrons

There are four EA-6B fleet squadrons with five aircraft and eight aircrews each. These squadrons follow a repeating 24-month cycle as shown in Figure 2-17. Like the other fleet squadron types, EA-6B squadrons deploy overseas as part of a unit deployment program (UDP). Each deployment is preceded by an 18-month workup period. EA-6B sortie allocations were developed following the method described for the Navy fleet squadrons. The simulated calendar year timeline for the four MCAS Cherry Point EA-6B squadrons is shown in Figure 2-18. The squadrons typically work Monday through Friday; however, weekends are utilized to catch up on incomplete training due to unforeseen events, such as bad weather and equipment failures.

The EA-6B fleet squadrons utilize Hangars 1700, 130, and 1701. They conduct refueling operations in the fuel pits located along Taxiway Hotel near Taxiway Golf.

### 2.5.2.3 KC-130 Fleet Squadrons

The KC-130 fleet squadron has 14 aircraft and 14 aircrews. Unlike the other fleet squadrons, the KC-130s do not follow a regularly recurring cycle of operations. Because of this, the KC-130 squadron was modeled as conducting a fairly constant level of training for each of its mission types during the simulated year. Approximately 75 percent of all sorties are flown away from the study region, with a typical mission originating from MCAS Cherry Point and visiting other airfields prior to returning. Most sorties originating or terminating at MCAS Cherry Point occur Monday through Friday; however, many of the "away" sorties are flown on weekends.

The KC-130 fleet squadron occupies Hangar 250, with many of its aircraft on the ramp adjacent to the hangar. Typically, the KC-130 aircraft are refueled by a truck on its ramp.

## 2.5.3 Fleet Replacement Squadron Operations

Fleet replacement squadrons (FRS) are units whose purpose is to train aircrews in a particular fleet airframe. After completing the FRS syllabus, a pilot or crew member is assigned to a fleet squadron.



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Month	-	8	6	4	10	9	7	80	0	\$	=	2	13	44	15	16	=	82	19 2	20 21	22	23	24	_
Events					Square Ton Cetach Traint Traint Weeks		Squad ron detach- men 3 weeks				( in the second	6 weeks			2 2 2 Weeks		_			WEU 8	[12등] [돌	11 / 1		
Detachment WTI Deployment		Detachments supporting large exercises. Traini Weapons tactics instructor. 2 - 3 aircraft and 1 Oversess deployment. Entire squadron particip	nts suppo tactics ins deployme	nting larg structor. ; nt. Entire	e exercis 2 - 3 aircr 9 squadro	es. Train aft and 1 n particit	ling incluc I pilot par pates.	ng includes electr pilot participates. setes.	onic warf	are, strik	e, low alt	tude tacti	cs, and de	fensive to	Ictics. Pa	rticipation	may inv	olve the	antire squ	Detachments supporting large exercises. Training includes electronic warfare, strike, low altitude tactics, and defensive tactics. Participation may involve the entire squadron or only 2 - 3 aircraft.  Oversess deployment. Entire squadron participates.	ıly 2 - 3 air	craft.		T

Figure 2-17: EA-6B Fleet Squadron Nominal Workup Cycle

SEP				
AUG	Squadron detachment 3 weeks			Squadron detachment 3 weeks
JUL		Deployment 6 months		os p
NOC		Obplo	2 elicati detach ment 2 weeks	
МАУ				Squadron detachment 3 weeks
APR				
MAR			6 weeks	
FEB				
JAN	Deployment			
DEC	Depti	2 aircieft detach ment. 2 weeks		
NOV			Squedron detectment 3 weeks	Benloyment 6 months
ОСТ		WTT.		
Squadron		2	•	

Figure 2-18: EA-6B Fleet Squadrons' Timeline



## 2.5.3.1 Fleet Replacement Squadron Training Requirements

The methods for creating the NASMOD FRS training requirement inputs are similar to those described in Section 2.5.1.3 for the fleet squadrons. The class training syllabus is synonymous to the fleet workup cycle. Typically, students are grouped into classes that proceed through various phases of instruction, beginning with aircraft familiarization. The commencement of each class is staggered chronologically such that, during any given week, the FRS may be working on a limited set of mission types. Figure 2-19 shows a hypothetical annual timeline of classes for the F-14 FRS.

### 2.5.3.2 F-14 FRS

The F-14 FRS trains aircrews for both the Atlantic and Pacific F-14 fleet squadrons through a 34-week program. Table 2-8 shows the number of pilots and Naval flight officers (NFOs) — radar intercept officers (RIOs) for the F-14 — that the F-14 FRS completes each year. These students are grouped into five classes. Within each class are different categories of students. Category I are new students that have not previously flown in the fleet. Categories II through IV are students that have experience in other airframes or need refresher training. Category V students learn exclusively Tactical Air Reconnaissance Pod System (TARPS) mission techniques. An IUT is an "instructor under training" and is a future FRS instructor. Each student category requires a different number of flight hours to complete its syllabus, with the "Cat" I pilot requiring the most hours. The total

flight hours required to complete the 100 Cat II–V pilots is equivalent to the syllabus flight hours of 29 Cat I pilots; consequently, a total of 69 Cat I "equivalent" pilots complete F-14 FRS training each year.

Likewise, the F-14 FRS annually completes 53 Cat I equivalent RIOs.

Table 2-8: F-14 FRS Annual Pilot Loading

			Cate	gory		
	ı	11	111	IV	<u> v</u>	IUT
Pilots	40	5	32	33	30	12
NFOs	24	10	36	24	32	12

In FY99, the F-14 FRS is expected to have approximately 38 F-14A/B and 10 F-14D model aircraft. Of these 48 aircraft, an average of 38 are expected to be mission capable on any given day, with the rest undergoing maintenance. The squadron utilizes Hangar 404, which is located midway along the western-facing ramp area and can service aircraft between missions in approximately two hours, exclusive of refueling time. The F-14 FRS prefers to operate Monday through Friday, with first daytime takeoffs at about 0730. Preferred first nighttime takeoffs are about 30 minutes after sunset. The F-14 FRS may fly during weekends and any time of the day, as needed in order to meet training requirement goals.



Month	October	November	December	January	February		March	April	L	May	=	June	July	-	August	-	September	ě
CIRRE	0 1 2 3 4	8 6 7 8 8	10 11 12 13	13 14 15 16 17	18 19 20	10 20 21 22 23	24 25 26	26 27 28 29 3	30 31 32	33 24	*	37 38 38 40	40 41 42	2	45	8	48 50	51 52
3-58	OTICS   IFR/FCLP/CQ &	≥ bo/a									1						-	$\overline{}$
8	AS GUNS STR	STHIKE TACT	TACTICS:   IFR/F	FR/FCLP/CG														
8	FAM	BEFAS	ADFAS GU	GUNS STRIKE	Ц	TAETTESN	IFR/FCLP/Cd	» po/a										
8	<u> </u>		FAM	BEFAS	AD	ADFAS GUNS	Ш	STHKE	TACTICS	H	IFR/FCLP/Cd	20						
<b>5-88</b>					FAM	2	$\mathbb{H}$	BEFAS	ADFAS	GUNS	Ш	STRIKE	TACTICS	83	Ħ	FCL	FCLP/CQ	
8							Ц		FAM			BEFAS	ADFAS	GUNS	Ш	STHIKE TACTIOS	TAC	TICS
8													FAM		H	BEFAS	AD	ADFAS
8 9																FAM	IM	
Shaded bars	Shaded bars indicate training performed on detachment away from	ormed on detachme	ent away from NAS	NAS Oceana.														
	LEGEND:																	
	FAM	Familiarization phase	phase			STRIKE		Strike (A/G) Phase	ø									
	BEFAS		nent Phase			TACTICS		Tactics (ACM) Phase	ase									
	ADFAS	Advanced Fleet Air Superiori	t Air Superiority Pt	ty Phase		Œ	Ē	In-flight Refueling Phase	Phase									
	GUNS	Air-to-Air Gunnery Phase	ery Phase			FCLP/CQ		Carrier Qualification Phase	on Phase									

Figure 2-19: Hypothetical F-14 FRS Class Timeline for FY99



### 2.5.3.3 F/A-18 FRS

The F/A-18 FRS trains pilots for the Navy and Marine Corps fleet squadrons and occasionally instructs foreign military pilots. The F/A-18 FRS training syllabus is very similar to the F-14 FRS but shorter in duration. Like the F-14 FRS, the F/A-18 student pilots participate in three detachments: strike, fighter weapons training, and carrier qualifications. The F/A-18 FRS is expected to complete ten 31-week classes each year, with a total number of students as shown in Table 2-9. Category I through Category IV students are like those described in the previous section on the F-14 FRS. The 120 Category I through IV pilots are equivalent to

86 Category I pilots in terms of flight hours required. The CQ category consists of students that only require carrier qualification. The NVG students are current fleet squadron pilots that need training in the newly developed

Table 2-9: F/A-18 FRS Annual Pilot Loading

			С	atego	ry		
		11	111	IV	CQ	NVG	IUT
Pilots	55	24	21	20	7	45	13

night vision goggle missions. The IUT students are the instructors under training.

In FY99, the F/A-18 FRS is expected to have approximately 48 aircraft, with an average of 29 expected to be mission capable on any given day. The squadron prefers to operate Monday through Friday, with first daytime takeoffs at about 0800. Like the F-14 FRS, the F/A-18 FRS may fly during weekends and afterhours in order to meet training requirement objectives.

Each class conducts one strike (air-to-ground) detachment and one fighter weapons tactics (FWT, air-to-air) detachment. The strike detachments are currently held at the Fallon Range Training Complex, and the FWT detachments are located NAS Key West. The first few syllabus flights for each of these training phases are performed locally. The class concludes with four weeks of FCLP training and one week of carrier qualifications.

The F/A-18 FRS occupies 122 in the eastern-facing ramp area at NAS Oceana.

### 2.5.3.4 AV-8 FRS

The AV-8 FRS trains pilots for the MCAS Cherry Point AV-8 fleet squadrons and groups its students into five classes per year. There are four categories of students as shown in Table 2-10. The basic, refresher, and modified refresher are similar to the F-14 FRS Categories I,

II, and III students. The annual replacement aircrew (RAC) rate is approximately 52, where the number of hours flown by a basic student generates the equivalent of one RAC.

Table 2-10: AV-8 FRS Annual Pilot Loading

		Cate	gory	
	Basic	Refresher	Modified Refresher	IUT
Pilots	43	27	13	12



The squadron has 14 AV-8B and 14 AV-8T aircraft; however, usually about ten on average are readied each work day. The preferred work week is Monday through Friday with weekends available for catching up with incomplete training. Nighttime missions are the focus of training one week each month. The AV-8 FRS is located in Hangar 3998 at MCAS Cherry Point.

### 2.5.3.5 KC-130 FRS

Unlike the other FRSs, the KC-130 FRS does not group students into classes but works them into the squadron flight schedule as they enter the FRS. The basic/transition pilot can complete syllabus flights in any order after completing the first five familiarization

flights. The number of each category of student is given in Table 2-11. The KC-130 FRS squadron is similar to the KC-130 fleet squadron in that many of its sorties are flown outside the study region on events extending over multiple days.

Table 2-11: KC-130 FRS Annual Student Loading

		Category	
	Basic/ Transition	Refresher	IUT
Pilots	43	27	12
Navigators	16	(all categories	s)

The KC-130 FRS has seven aircraft of which five or six are typically mission capable on any given day. The preferred work week is Monday through Friday with about two or three sorties flown per day. The first flights of the day generally takeoff around 0900 to 1000. The FRS occupies Hangar 250 with the KC-130 fleet squadron.

### 2.5.4 Adversary

VFC-12 is the only adversary squadron permanently based at NAS Oceana. This squadron is a component of the Navy Reserve Airwing 20 (CVWR-20), which has the task of maintaining adversary squadrons. Navy adversary support resources are undergoing realignment, and the information contained in this section may not be current. The discussion contained herein describes the information available for this study, unresolved issues, and offers a rationale for the resulting assumptions.

In FY98, CVWR-20 is expected to include the following squadrons:

VFC-12	12 F/A-18 aircraft, based at NAS Oceana
VFC-13	F-5 aircraft, based at NAS Fallon
VF-201	F-14 aircraft, based at NAS JRB Fort Worth
VFA-203	F/A-18 aircraft, based at NAS Atlanta
VFA-204	F/A-18 aircraft (new squadron), NAS New Orleans
(CVWR-20 al	so consists of EA-6B, S-3, and E-2 squadrons. However,
	aft do not perform local support functions and do not imp

(CVWR-20 also consists of EA-6B, S-3, and E-2 squadrons. However, these aircraft do not perform local support functions and do not impact this study.)



In FY96, two CVWR-20 squadrons — VFA-127, based at NAS Fallon, Nevada, and VF-45, based at NAS Key West, Florida — were decommissioned. VF-45, in recent years (e.g., FY95), was the primary supporter of the F/A-18 FRS at NAS Cecil Field for fighter weapons training (FWT). With VF-45 unavailable in FY99 and the F/A-18 FRS relocated to NAS Oceana, AIRLANT personnel estimate that any of the CVWR-20 squadrons may provide FWT support to the NAS Oceanabased F/A-18 FRS.

The adversary squadrons' impacts at NAS Oceana will depend upon which training programs conducted by CVWR-20 squadrons will be performed locally. The F-14 FRS will continue to conduct a portion (about 20 percent) of its ACM flights at NAS Oceana. Similarly, the F/A-18 FRS will perform approximately 40 percent of its FWT phases at NAS Oceana and the rest on detachment. Atlantic fleet squadrons will perform two weeks of their SFARP at NAS Oceana and one week of the air-to-ground phase of SFARP on detachment. Tactics missions, requiring dissimilar aircraft, will be performed during the local phases of SFARP, and a combination of adversary squadrons will typically support this training. Pacific fleet F-14 squadrons will detach for the entire SFARP, most likely to the west coast.

In light of the issues concerning a reduced CVWR-20, it is assumed for the purposes of this study that adequate adversary support will be available in the future for FRS and SFARP training at NAS Oceana. For each of the five F-14 FRS classes during the year, VFC-12 will provide primary support for the F-14 FRS's ACM training, locally and on detachment. For other squadrons, the identity of an adversary squadron cannot be forecast with certainty within the scope of this study, particularly for F/A-18 FRS and local SFARP missions. Operations by adversary aircraft at the airfield or in training areas are identified as "Adversary" with no aircraft type specified. AIRLANT personnel did, however, provide a rough estimate of the adversary aircraft-type proportions for NAS Oceana-based sorties: 70 percent to 75 percent F/A-18A, 10 percent to 20 percent F-14, and 5 percent to 15 percent F-5.

## 2.5.5 Non-NAS Oceana- or MCAS Cherry Point-based Squadrons and Units

Units based at locations other than NAS Oceana or MCAS Cherry Point are modeled in less detail than those based at these study airfields. Data collection was limited to the information necessary to sufficiently model their activities at the airfield and in the training areas.

For purposes of this study and in discussions with ATC personnel, it was determined that non-participating flights should not be modeled beyond direct interaction with the study airfield traffic. In the context of this report, non-participating flights include military, commercial, and general aviation aircraft flying on airways or direct routings.



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## 2.5.5.1 NAS Oceana and MCAS Cherry Point Airfield Transients

Both NAS Oceana and MCAS Cherry Point have a number of aircraft that are assigned directly to the air stations. For example, MCAS Cherry Point supports a Station Operations and Engineering Squadron (SOES), which is composed of two C-9B and two C-12 fixed-wing aircraft and three HH-46A helicopters. These "station" aircraft contribute few operations compared to the total number of operations performed annually at the air stations. In addition, a number of airfield operations is generated annually by aircraft not permanently based at the two air stations of this study. These two types of "background" traffic are grouped into the category of transient aircraft (although the station aircraft are not technically. transient). Many of the non-station-based aircraft belong to units participating in various exercises conducted in the local airspace. The air stations host many of these visitors for the duration of the exercise. Other transients include various military logistics and support flights, as well as aircraft that may perform practice approaches. Future levels of transient operations are generally difficult to predict since they are not necessarily related to the future level of based-unit operations. Consequently, FY95 monthly airport traffic reports are used to forecast future levels of transient operations.

Tower air traffic analyzer data are used to predict the proportions of instrument and visual takeoffs, approaches, touch-and-go operations, and landings. Due to the lack of specificity in the traffic analyzer data, the identity of transient aircraft cannot be determined beyond a general grouping of Navy/Marine Corps and other military. Consequently, the transients are categorized into the following two groups:

Transient Jets A wide variety military aircraft such as F-14,

F-15, F-16, F/A-18, and S-3 jets.

Transient Props Primarily C-2, C-12, C-130, E-2, and T-34

aircraft.

Transient Heavy Primarily C-5, C-141, and KC-10 aircraft.

Transient Large Primarily C-9 aircraft.

Transient Helicopter Includes AH-1, H-46, H-53, OH-58, AH-64,

and UH-1 aircraft.

## 2.5.5.2 NAS Norfolk-based E-2/C-2

There are five E-2 fleet squadrons, one C-2 fleet squadron, and one E-2/C-2 FRS based at NAS Norfolk, which is located approximately 16 miles to the northwest of NAS Oceana. These squadrons generate a significant amount of FCLP operations at NALF Fentress throughout the year. One E-2 fleet squadron is attached to each Atlantic airwing, and each squadron follows a FCLP work-up schedule very similar to the F/A-18 and F-14 fleet squadrons' schedules. The C-2 fleet squadron supports each Atlantic airwing with a 2-aircraft/6-aircrew detachment; C-2 fleet FCLP operations are conducted on a regular basis



throughout the year. The E-2/C-2 FRS normally has five classes of pilots per year; each class conducts six weeks of FCLP training, of which one week is spent at NAS Key West.

Note that the E-2/C-2, F-14, and F/A-18 FRSs have scheduling priority at NALF Fentress, except for two weeks prior to a fleet carrier detachment or deployment, during which the E-2, C-2, F-14, and F/A-18 fleet squadrons have scheduling priority.

E-2/C-2 operations (pattern work) conducted at NAS Oceana are captured in the *Transient Props* category described above, and E-2/C-2 flights in W-72 are included in *Other Navy*, as described in the following section.

## 2.5.5.3 Other Navy

This category denotes Navy aircraft that are not based at NAS Oceana but use local training areas. The majority of these are E-2, C-2, P-3, and helicopters operating out of other airfields (e.g., NAS Norfolk) and jets operating from carriers located off the coast. A small number of these aircraft may be visiting NAS Oceana in order to perform joint training with the local squadrons. In this case, their airfield operations are included in the airfield *Transient* categories.

### 2.5.5.4 Other Marine Corps

The Marine Corps generates a significant number of operations in the training areas examined by this study. MCAS New River, North Carolina, is home to two AH-1W/UH-1N, six CH-46E, and two CH-53E Fleet Marine Force (FMF) helicopter squadrons, one CH-46E FRS, and one CH-53E FRS. All of these squadrons are significant users of the R-5306A complex, including BT-11 and BT-9. The AV-8B squadrons also use Navy Dare on a regular basis.

Another source of Marine Corps sorties is MCAS Beaufort, South Carolina. F/A-18 squadrons based there participate in joint training with MCAS Cherry Point and NAS Oceana squadrons, and they generate a number of sorties on the bombing targets and in the warning areas.

### 2.5.5.5 Air Force

The Air Force and Navy have historically favored different airspace and, to some degree, have operated independently of each other. This is evidenced by the north-south partition of R-5314 and the existence of two, separately managed bombing ranges in Dare County: Navy Dare in the northern half and Air Force Dare in the south. Nevertheless, most of the training areas examined in this study are used, to a greater or lesser extent, by all the branches of the military, and the Air Force presence is substantial.

Langley Air Force Base (AFB), Virginia, is home to the 1<sup>st</sup> Fighter Wing, which consists of three F-15C squadrons. Their demand is primarily on W-386; however,



they also use W-72 and R-5314. The 4th Wing at Seymour Johnson AFB, North Carolina, is home to four F-15E squadrons — two fighter units (FUs) and two fighter training units (FTUs). These squadrons are significant users of Dare County, Navy Dare as well as Air Force Dare. They also use W-72, W-122, BT-11, and BT-9. Pope AFB, North Carolina, is home to F-16 and A-10 squadrons. The F-16 squadrons prefer W-122 for air-to-air missions due to its close proximity; however, they sometimes use W-72. The F-16 and A-10 squadrons use the Dare County ranges, BT-11, and BT-9 extensively for air-to-ground missions. Shaw AFB, South Carolina, is also home to F-16 and A-10 squadrons, but at a distance of over 240 NM from R-5314, these squadrons have a much smaller impact on the ranges studied. The Virginia Air National Guard (F-16 aircraft), Richmond, performs a significant amount of operations during the weekend. It uses Dare County for air-to-ground training and primarily W-386 for air-to-air training. It also uses W-72 and the TACTS range.

Air Force Dare range is the primary air-to-ground training area for aircraft units based at Seymour Johnson AFB and Pope AFB. Due to the overall volume of missions conducted during the year as well as during "surge" training, these units utilize other ranges to meet training milestones. These squadrons use Navy Dare, BT-11, and BT-9 when available to complete the training that cannot be accommodated by Air Force Dare and to provide a variety of training environments (e.g., different types of targets, different run-in views, and the electronic range at BT-11).

The proposed operations of the units listed above are based upon FY95 historical operations and estimations by Air Force personnel. Note that the only squadron realignment proposed to occur between FY95 and FY99 at the Air Force bases discussed above is at Seymour Johnson AFB, where one FU is converted to a FTU in the FY95–FY96 time frame.

### 2.5.5.6 Coast Guard

The Coast Guard generates a relatively small number of flights in the warning areas. These are predominantly helicopter and C-130 aircraft based at the Coast Guard Air Station, Elizabeth City, North Carolina.

#### 2.5.5.7 Contractor

Contractors are employed by the military for various aerial support services, such as banner towing for air-to-air gunnery practice, and fly a number of different aircraft such as Lear jet and Mitsubishi aircraft for these tasks. Many of these contractor sorties originate from Newport News/Williamsburg International Airport, Virginia.



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### 2.5.5.8 Civilian

These users operate a wide range of aircraft types, both commercial and private (e.g., Boeing 747, Cessna 172). These users are observed in the warning areas and are usually transiting the airspace. The primary flows of civilian air traffic are routed around or above the NAS Oceana and MCAS Cherry Point airspace and nearby warning areas, MOAs, and Dare County range, and do not impact or interact with military aircraft.

The military and civilian operations near R-5314 and Dare County Regional Airport at Manteo (on Roanoke Island in northeastern North Carolina) has been studied by ATAC analysts, and a summary of the analysis is included in Section 4.

## 2.6 Other Modeling Issues

The realism of a NASMOD simulation is obtained through the consideration of the many "real-world" conditions, events, and procedures that are designed into the model.

### 2.6.1 Mission Profiles

Mission profiles are used to describe the ways in which a given mission type is performed. During the process of developing training requirements, all aspects of individual mission evolutions were discussed with pilots from the various aircraft communities located at NAS Oceana, MCAS Cherry Point, and NAS Norfolk. Profile information includes, for example, mission-specific resource requirements and availability; range and special use airspace requirements and capabilities, including preferred and alternate training areas for conducting activities; routings to and from the activity areas; volume of airspace required for each activity; duration of an activity; return-to-base activities (e.g., GCAs, touch-and-go practice); meteorological restrictions; historical operating practices (e.g., scheduled exercises); squadron operating practices (e.g., sequence of training missions); and additional factors that may influence where, when, and how a mission is flown.

The mission profile elements for each flight type may vary in any number of ways from those of other flights in the same or similar type grouping. As an example, there may be two familiarization flights of equal duration, using the same training area, but each with significantly different return-to-base activity profile elements. Therefore, each has a unique profile, yet both achieve a common training requirement. Such diversity of requirements dictated that approximately 1470 individual profiles be created for this study, consisting of over 20,100 steps.

With the exception of NAS Norfolk-based E-2/C-2 squadrons and Seymour Johnson-based F-15s, units not based at NAS Oceana or MCAS Cherry Point are modeled using mission profile parameters derived from historical demand recorded by range control organizations. In the case of several of the ranges, it is not feasible to break down historical hours and operations by aircraft type because the



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total hours of reported utilization are not delineated by aircraft type, only by hours per service organization (e.g., Navy, Marine Corps, Air Force).

Due to the scope of the study, detailed flight traffic is only modeled for the portion of sorties completed within the local training area. Thus, for cross-country and detachment transit flights, only the pertinent local air traffic elements are modeled in detail. The model assumes the associated training requirements are completed away from the study region.

### 2.6.2 Mission Scheduling

In NASMOD, the flight frequency for each type of mission is established by the training requirements, which are in the form of the number of missions that the squadron would like to fly during a given time period. (Refer to the discussion on sortie allocations in Section 2.5.) Based on the number of missions desired and the number of working days in the time period, the NASMOD scheduler calculates a daily desired rate for each mission type. If this daily desired rate is not flown, the squadron will accumulate a backlog of missions that were desired and not flown. For most missions the daily desired rate will continue to increase as this backlog accumulates. This continues until the backlog of desired missions has been eliminated (flown).

NASMOD schedules FCLPs in a different manner. FCLP training requirements will only accumulate backlog during the two week window in which the FCLPs have been scheduled. Once the two week FCLP window is over, any remaining backlog is eliminated and counted as unmet requirements. For fleet squadrons, FCLPs have the highest priority of any mission that the squadron schedules.

### 2.6.3 Weather

The area weather is based upon historical data observed at the respective air stations, and this weather is applied in the model in the form of occurrences of various conditions of reduced visibility and ceiling. Four basic types of weather conditions are modeled:

- <u>Clear weather</u>: This weather type is default, with the ceiling at or higher than 3000 feet (AGL) and the visibility at or greater than 3 NM. All airfield arrival paths and patterns are available.
- <u>Clear Weather to Basic VMC</u>: The visual tower pattern and overhead break are available. FCLP operations can still occur under this weather condition.
- Instrument meteorological conditions (IMC). IMC conditions prevail at the airfield; the ceiling is less than 1000 feet and/or the visibility is less than 3 NM. Missions that must be performed under VFR (i.e., familiarization flights, FCLP training) are canceled. Missions that can (or must) be performed under IFR or above the cloud layers (i.e., air combat



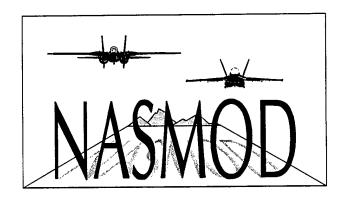
- maneuvers) can be completed. This weather condition is above departure minimums.
- <u>Approximate Departure Minimums:</u> During this weather condition, with the ceiling less than 200 feet and/or the visibility less than 0.75 NM, airfield operations are basically suspended. This weather condition may include severe weather, such as excessive ground fog or a hurricane, that also suspends operations or closes the airfield.

NASMOD applies the weather randomly such that the proportion with which each of these weather conditions is in effect varies by month according to historical meteorological records. A ceiling/visibility weather event can occur up to two time periods in the day at both MCAS Cherry Point and NAS Oceana: 0000 to 0900 and/or 0900 to 2400. The probability of a particular weather event occurring is based upon data that is averaged over the last 49 years. This data is provided by the air stations' meteorological units.

Each mission has weather requirements, and at the time of departure, if a weather event that is below a mission's requirements is active, the mission is canceled. FCLP and visual touch-and-go pattern operations do not occur in the model when the weather is at basic VMC or below. Practice GCAs or any type of departures do not occur when the weather is below departure minimums.



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# SCENARIOS RESULTS ANALYSIS

### **3 SCENARIO RESULTS ANALYSIS**

This section presents an analysis and comparison of the alternative scenarios. The analysis examines the quantitative and qualitative results of the NASMOD simulation in three major areas: squadron operations, airfield operations, and training area operations.

Each of the alternative realignment scenarios inherits the fundamental modeling assumptions of the baseline scenario. In the following discussions, an emphasis is placed on the relative rather than the absolute differences among the scenarios.

## 3.1 Squadron Operations

Squadron operations are evaluated primarily in terms of annual local sorties and flight hours, which are compared among the realignment scenarios. In addition, the efficiency with which the various aircraft communities complete their training provides a measure of the merits of a given scenario.

## 3.1.1 Squadron Sorties and Flight Hours

A local sortie is one in which the aircraft either departs or arrives (or both) at NAS Oceana or MCAS Cherry Point. Many of the modeled squadrons are deployed or detached away from their home base for periods of time during the simulated year. (Refer to the squadron modeling assumptions in Section 2.5.) Such "away" sorties, in which the entire sortie occurs away from the modeled airfield, are excluded from the annual sorties and flight hour statistics. The F/A-18 fleet squadron annual sorties and flight hours vary among the scenarios due to the various basing alternatives. In ARS-4 and -5, six F/A-18 fleet squadrons are located at NAS Oceana. Consequently, these two scenarios share consistent F/A-18 fleet sortie and flight hour statistics.

Table 3-1 presents the annual local sortie and flight hours for the NAS Oceana and MCAS Cherry Point tenant squadrons for each of the scenarios.

Note that there is very little fluctuation in the number of annual local sorties and flight hours for the squadron communities (F-14s, AV-8s, EA-6Bs, and KC-130s) that have a fixed basing for all the scenarios. This indicates that the various basing alternatives for the F/A-18 fleet squadrons do not affect the ability of other squadrons to complete their desired amount of annual local training. What little variation exists among the scenarios is due to the effects of randomness in the simulation. There are differences among the scenarios in the sorties and flight hours for the F/A-18 squadrons, however.

The F/A-18 fleet squadron annual sorties and flight hours vary among the scenarios due to the various basing alternatives. In ARS-4 and -5, six F/A-18 fleet squadrons are located at NAS Oceana. Consequently, these two scenarios share consistent F/A-18 fleet sortie and flight hour statistics.



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Table 3-1: Annual Sorties and Flight Hours of NAS Oceana and MCAS Cherry Point Tenant Aircraft

<u>L</u>	Basel	ine	ARS	-1	ARS	-2
Aircraft Groups	Sorties	Hours	Sorties	Hours	Sorties	Hours
NAS Oceana						
F-14 (Fleet)	12,580	16,620	12,704	16,706	12,604	16,487
F-14 (FRS)	6,912	9,992	6,929	10,049	6,920	10,027
F/A-18 (Fleet)	-	_	14,449	17,959	12,092	15,170
F/A-18 (FRS)		_	8,401	10,410	8,416	10,408
Adversary	418	440	585	658	536	594
Total	19,910	27,053	43,068	55,782	40,568	52,686
MCAS Cherry Point						
AV-8 (Fieet)	7,188	8,533	7,176	8,498	7,183	8,504
AV-8 (FRS)	5,993	6,231	5,992	6,221	5,996	6,224
EA-6B	2,070	3,800	2,071	3,801	2,070	3,797
F/A-18 (Fleet)		_		_		
KC-130 (Fieet)	401	1,303	401	1,304	401	1,297
KC-130 (FRS)	622	2,458	622	2,463	622	2,464
Total	16,274	22,326	16,262	22,287	16,272	22,286

	ARS	-3	ARS	-4	ARS	-5
Aircraft Groups	Sorties	Hours	Sorties	Hours	Sorties	Hours
NAS Oceana						
F-14 (Fleet)	12,636	16,629	12,630	16,533	12,627	16,654
F-14 (FRS)	6,949	10,067	6,931	10,044	6,959	10,087
F/A-18 (Fleet)	10,205	12,775	8,350	10,332	8,299	10,278
F/A-18 (FRS)	8,402	10,403	8,397	10,391	8,398	10,389
Adversary	585	683	511	558	594	687
Total	38,777	50,557	36,819	47,859	36,877	48,096
MCAS Cherry Point		•				
AV-8 (Fleet)	7,158	8,513	7,181	8,504	7,185	8,539
AV-8 (FRS)	5,987	6,217	5,996	6,216	5,992	6,220
EA-6B	2,071	3,807	2,070	3,797	2,071	3,813
F/A-18 (Fleet)	3,528	4,077	_	· _	5,467	6,715
KC-130 (Fleet)	400	1,294	401	1,301	401	1,297
KC-130 (FRS)	625	2,461	622	2,460	624	2,467
Total	19,769	26,371	16,270	22,278	21,740	29,051

Although ARS-1, -3, and -5 represent alternatives in which all 11 F/A-18 fleet squadrons are based at the modeled airfields, the number of annual fleet F/A-18 sorties in ARS-1 differs from the sum of the annual sorties for NAS Oceana and MCAS Cherry Point fleet F/A-18s of ARS-3 and ARS-5 by about five percent. This is a result of the modeling technique used to assign F/A-18 fleet squadrons to airwings as described in Section 2.5.1.6 and Appendix C. In ARS-1, Airwing C has two F/A-18 fleet squadrons, and Airwing E has three. In ARS-3 and ARS-5, this is reversed with Airwing C having three F/A-18 squadrons, and Airwing E having two. Since Airwing C spends a much greater portion of the simulated year away from the local area than Airwing E, ARS-3 and ARS-5 generate a lower number of local sorties than ARS-1.

The annual sorties and flight hours attributable to the adversary squadron vary considerably among the scenarios. This primarily reflects the assumption that the adversary squadron supports the fleet SFARP. Consequently, adversary operations are lowest for the Baseline Scenario (no local F/A-18 support), slightly increased



in ARS-4 (six local F/A-18 Squadrons), greater for ARS-2 (nine local F/A-18 squadrons), and greatest for ARS-1, -3, and -5 (eleven local F/A-18 squadrons).

# 3.1.2 Squadron Training Completion

For each scenario, all NAS Oceana and MCAS Cherry Point tenant squadrons are able to complete all training requirements during the appropriate simulated months. That is, no mission requirements are significantly postponed nor are any training requirements left incomplete at the end of the simulated year.

One reason for the postponement of a mission is a scheduling conflict with another squadron for a training area. Every simulated day, each squadron prepares a list of missions it wishes to fly; however, some of these missions may not ultimately appear on that day's flight schedule because of conflicts with other squadrons for training areas. Usually, the mission can be successfully scheduled if it uses a less-preferred training area or changes the takeoff time of the flight. Section 2.6.2 and Appendix D.1.2 describe the methodology used by NASMOD to determine the flight schedule for each day of the simulation.

Table 3-2 provides the percentage of all missions being considered for the next day's flight schedule that must either: a) adjust the takeoff time or training area location, or b) postpone the mission to a later date. Notice that the F-14 and F/A-18 FRS squadrons more frequently postpone rather than adjust a mission that is under consideration for the next day's schedule. This is primarily because a FRS syllabus flight typically has a profile with specific training areas and day/night requirements. Consequently, the FRS is less likely to modify a mission in order to include it on the schedule if a preferred training area or takeoff time will be unavailable.

The Navy fleet squadrons show the opposite behavior. Fleet squadrons are more flexible than FRS squadrons when determining their daily flight schedule. They can often adjust a mission in several ways, such as using a secondary training area or performing unit level training when supporting aircraft from other squadrons cancel. An exception to this behavior is for MCAS Cherry Point based F/A-18s. The results for ARS-3 and ARS-5 indicate that approximately 25 percent of all missions under consideration for a flight schedule are postponed. Three quarters of these postponed missions are FCLPs. FCLPs are difficult to schedule because the Navy F/A-18 fleet squadrons do not have an outlying landing field and must perform this training at MCAS Cherry Point, unlike the NAS Oceana-based F/A-18 squadrons which use NALF Fentress. In addition, the F/A-18 fleet squadrons do not receive scheduling priority when planning their FCLP periods but must work with the other MCAS Cherry Point squadrons when devising a schedule.



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Table 3-2: Percentage of Missions Affected by Scheduling Constraints

	•				•	
	Bas	Baseline		S-1	AR	S-2
Aircraft Groups	Adjusted	Postponed	Adjusted	Postponed	Adjusted	Postponed
NAS Oceana						
F-14 (Fleet)	12.2%	2.9%	19.0%	5.4%	18.6%	4.9%
F-14 (FRS)	1.6%	12.2%	1.9%	14.8%	1.7%	15.3%
F/A-18 (Fleet)	· -		15.8%	8.6%	14.3%	7.6%
F/A-18 (FRS)	_	-	2.3%	6.0%	2.1%	6.5%
Adversary	1.5%	1.4%	17.1%	5.8%	14.9%	3.0%
MCAS Cherry Point						
AV-8 (Fleet)	2.8%	2.1%	3.6%	2.6%	3.2%	2.3%
AV-8 (FRS)	0.9%	2.7%	1.9%	3.5%	1.6%	3.4%
EA-6B	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
F/A-18 (Fleet)	-	-l		_		_
KC-130 (Fleet)	0.3%	0.0%	0.3%	0.0%	0.3%	0.0%
KC-130 (FRS)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	•		'	'	•	
	AR	S-3	AR	S-4	AR	S-5
Aircraft Groups	Adjusted	Postponed	Adjusted	Postponed	Adjusted	Postponed
NAS Oceana						
F-14 (Fleet)	17.8%	4.9%	17.0%	3.4%	17.0%	5.2%
F-14 (FRS)	2.0%	14.1%	1.7%	14.4%	2.1%	13.4%
F/A-18 (Fleet)	12.7%	13.1%	12.8%	5.3%	13.8%	6.0%
F/A-18 (FRS)	2.5%	6.1%	2.2%	5.0%	2.6%	5.6%
Adversary	10.3%	5.9%	10.1%	2.8%	9.8%	6.6%
MCAS Cherry Point						
AV-8 (Fleet)	4.3%	2.1%	2.9%	2.2%	4.0%	2.2%
AV-8 (FRS)	2.3%	3.6%	1.1%	3.6%	2.3%	5.3%
EA-6B	0.1%	4.7%	0.0%	0.0%	0.0%	5.3%
F/A-18 (Fleet)	6.4%	24.7%			5.8%	25.4%
KC-130 (Fleet)	0.1%	1.7%	0.3%	0.0%	0.2%	2.1%

While this does not hinder the ability of the MCAS Cherry Point F/A-18 fleet squadrons to complete their FCLP training, they must expend a greater amount of effort in planning the FCLP workup.

3.3%

0.0%

0.0%

0.9%

3.8%

1.7%

A comparison between the Baseline Scenario and ARS-1 for the mission adjustment/postponement percentages for the Marine Corps squadrons reveals that only the AV-8 squadrons would experience a perceptible increase in scheduling difficulties if all the F/A-18 squadrons were based at NAS Oceana, due primarily to competition for time at BT-11. For either scenario, these percentages are low, however. The AV-8 mission postponement percentage is fairly constant for all the scenarios, despite the fact that ARS-3 involves basing F/A-18 squadrons at MCAS Cherry Point. For these scenarios, the AV-8 mission adjustment percentage is somewhat higher, reflecting a slightly greater need for the AV-8 squadrons to use alternate training areas and takeoff times.

While the mission adjustment/postponement percentages for the Marine Corps squadrons for ARS-3 and ARS-5 are low, they may be perceived to be much greater. That is, in the Baseline and ARS-1,-2, and -4, in which *no* Navy squadrons are based at MCAS Cherry Point, the EA-6B and KC-130 squadrons experience almost no difficulties scheduling their missions. Under ARS-3 and ARS-5, in which F/A-18 squadrons *are* based at MCAS Cherry Point, the EA-6B



KC-130 (FRS)

and KC-130 squadrons experience a small yet consistent level of difficulty in mission scheduling. EA-6B and KC-130 squadron personnel who experience a transition from the Baseline Scenario to ARS-3 or ARS-5 may *perceive* the increase in scheduling difficulty to be significant.

#### 3.2 Airfield Operations

The airfield operations data are presented in detail in Appendix A, and the discussions in this section refer to these data. An examination of these data yields informative comparisons between the alternative realignment scenarios of the levels of activity that can be expected with the different F/A-18 basing options. Comparisons of the various types of airfield delay and pattern congestion are examined, as well.

Figure 3-1 shows the annual airfield operations at NAS Oceana, NALF Fentress, MCAS Cherry Point, and MCALF Bogue Field for the baseline and five alternative scenarios. The F/A-18 squadrons are not expected to use MCALF Bogue Field even if based at MCAS Cherry Point; consequently, the level of MCALF Bogue Field operations is fairly constant across all the scenarios.

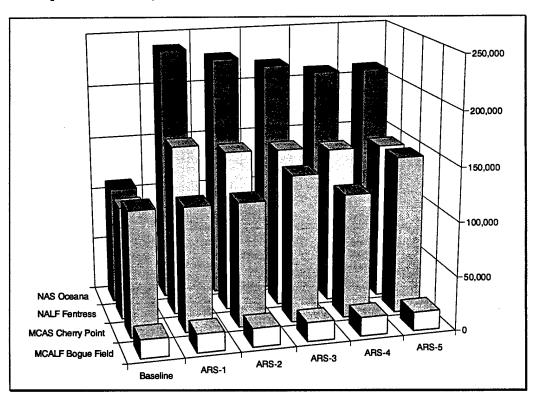


Figure 3-1: Summary of Annual Airfield Operations



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#### 3.2.1 NAS Oceana Operations

All of the alternative scenarios involve the relocation of F/A-18 squadrons to NAS Oceana, resulting in a significantly greater number of annual operations than are observed for the Baseline Scenario. Figure 3-2 illustrates the proportion of day (defined as 0700–2200) versus night (2200–0700) operations. The percentage of

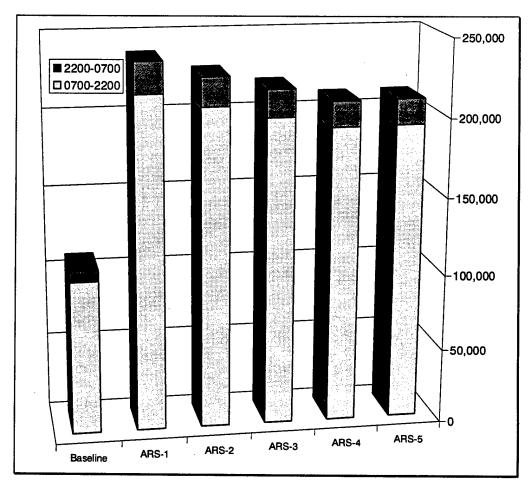


Figure 3-2: NAS Oceana Annual Airfield Operations

night operations for the alternative scenarios ranges from 8.1 percent (ARS-3) to 8.5 percent (ARS-1) of total operations while it is 6.5 percent for the Baseline Scenario. This reflects the heavier emphasis on nighttime operations by the F/A-18 squadrons.

With the greatest number of squadrons based at NAS Oceana (25 squadrons) of the analyzed scenarios, ARS-1 generates the greatest increase in annual operations over the Baseline Scenario, as shown in Table 3-3. The F/A-18 FRS generates 47 percent (over 60,000) of the additional operations in ARS-1; if only the FRS

Table 3-3: Percentage Increase in Annual NAS Oceana Operations over the Baseline

ARS-1	118.1%
ARS-2	108.6%
ARS-3	100.6%
ARS-4	92.6%
ARS-5	92.9%



is realigned to NAS Oceana, airfield operations would increase by 56 percent over the Baseline Scenario. The increase over the baseline is significantly less for ARS-4 and ARS-5 which have six (vice 11) F/A-18 Fleet squadrons based at NAS Oceana.

Pattern operations at NAS Oceana significantly increase with the realignment of the F/A-18 squadrons in each of the alternative scenarios. Table 3-4 shows the number of annual operations conducted in the VFR pattern, the FCLP pattern, and the instrument pattern for each scenario. Table 3-5 presents the percentage increase over the Baseline Scenario in each pattern type at NAS Oceana for the alternative realignment scenarios. The VFR touch-and-go operations are more than doubled in all scenarios, with the F/A-18 FRS alone contributing over 38,000 operations. NAS Oceana-based squadrons prefer to conduct FCLP operations at NALF Fentress and utilize NAS Oceana only when NALF Fentress is unavailable. In the Baseline Scenario, squadrons are able to complete their FCLP training without utilizing NAS Oceana; however, in each of the alternative scenarios, NAS Oceana is utilized for FCLP training. This "off-load" of operations represents about three percent of the total FCLP operations conducted by NAS Oceana-based squadrons in ARS-1. Note that the amount of exclusive-use pattern time utilized at NAS Oceana (on Runway 5L) in ARS-1 is approximately 25 hours for the year.

Table 3-4: Annual Pattern Operations at NAS Oceana

	Baseline	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
VFR Touch-and-Go Operations	52,300	117,800	114,200	110,800	106,700	106,500
NAS Oceana FCLP Operations	0	3,500	2,900	1,400	2,300	1,800
Instrument Touch- and-Go Operations	9,400	17,300	17,000	16,600	16,100	16,200

Table 3-5: Percentage Increase in Annual Pattern Operations at NAS Oceana over the Baseline

	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
VFR Touch-and-Go Operations	125%	119%	112%	104%	104%
Instrument Touch- and-Go Operations	84%	80%	77%	71%	72%

One measure of potential airfield congestion is the average amount of taxi time required per sortie. For this calculation, taxi time is considered to be the time an aircraft spends moving from one point to another on the airfield before and after a flight. Time spent arming, de-arming, pit refueling, or waiting for an available fuel pit, while modeled, is not included in the taxi time delay analysis since not all sorties perform these activities. Consequently, the only taxi times considered are the time spent in motion and the delays imposed by pilot and controller action,



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such as holding short for takeoff and waiting to cross active runways or busy taxiways. All sorties are subject to these types of delays, regardless of their mission. As can be seen from Table 3-6, the average taxi delay for ARS-1 is almost double that for the Baseline Scenario, generating about a 15 percent increase in the total average sortie taxi time.

Table 3-6: Average "Per Sortie" Taxi Times (in minutes) for NAS Oceana

Per Sortie (sum of pre-takeoff and post-landing)							
	Taxi Duration	Taxi Delay					
Baseline	15.1	1.0					
ARS-1	17.3	1.9					
ARS-2	17.1	1.8					
ARS-3	17.0	1.7					
ARS-4	16.8	1.6					
ARS-5	16.8	1.6					

The amount of delay a sortie experiences while refueling in the pits is another indicator of airfield congestion. Section 2.2.1 notes that the fuel pits are modeled to accommodate the simultaneous refueling of up to four aircraft on the western-facing ramp and four aircraft on the eastern-facing ramp, with queues of up to six aircraft allowed for each ramp area. The six-aircraft-per-queue limit is the threshold used by the model to determine the point at which additional aircraft taxi directly to their line without waiting to refuel at the pits.

Table 3-7 lists some noteworthy fuel pit statistics for selected scenarios. The Total Aircraft Requesting Pit Refueling is a count of all the annual sorties that will use the fuel pits if they can. The Aircraft that Must Wait is the number of aircraft that want to use the fuel pits but find them all occupied upon arrival. Note that this value is 141 percent higher for ARS-1 than it is for the baseline while the number of aircraft requesting pit refueling is only 112 percent higher. This difference in the relative comparisons of the two statistics indicates that the fuel pit capacity adversely affects the level of operations for ARS-1. This condition is not the case for ARS-3. The Aircraft that Must Wait statistic is given as a proportion of Total Aircraft Requesting Pit Refueling in the row labeled Percentage of Total Aircraft that Must Wait. This percentage can also be interpreted as the probability that the desired fuel pit is occupied when an aircraft wishes to enter. The Percentage of Aircraft that Cannot Enter Queue is a subset of the Percentage of Total Aircraft that Must Wait. This is the proportion or probability that not only are the four fuel pit slots in a given ramp area full, but there are already six aircraft waiting when another aircraft arrives. The queues for the western-ramp and eastern-ramp fuel pits are assumed to be independent; however, these statistics aggregate the fuel pits of both ramps. The Average Wait Prior to Refueling is virtually the same in all scenarios. This is the amount of time that an aircraft, once it has entered the queue, will actually spend waiting for a fuel pit slot.



Table 3-7: NAS Oceana Annual Fuel Pit Usage and Delay

·	Baseline	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
Total Aircraft Requesting Pit Refueling	22,981	48,812 112% higher than Baseline	45,858 100% higher than Baseline	44,176 92% higher than Baseline	41,644 81% higher than Baseline	42,103 83% higher than Baseline
Aircraft that Must Wait	4,080	9,825 141% higher than Baseline	8,555 110% higher than Baseline	7,945 95% higher than Baseline	7,142 75% higher than Baseline	7,418 82% higher than Baseline
Percentage of Total Aircraft that Must Wait	17.8%	20.1%	18.7%	18.0%	17.2%	17.6%
Percentage of Aircraft that Cannot Enter Queue	0.8%	1.0%	0.8%	0.9%	0.7%	0.8%
Average Wait Prior to Refueling (in minutes)	4.4	4.5	4.4	4.4	4.4	4.4

Some aircraft returning to base desire to conduct pattern operations but are unable to access the patterns due to several factors. As mentioned in Section 2.3.2, NAS Oceana ATC places a limit of five aircraft in the VFR touch-and-go (or tower) pattern. This five-aircraft limit is specified as a firm constraint in NASMOD. If an aircraft arrives at a time when five other aircraft are in the pattern or if FCLP operations are underway, it cannot enter the visual pattern and must proceed to the next action specified in its profile (e.g., perform a full stop landing). (Note that for modeling purposes, an aircraft conducting an overhead break arrival directly to a full-stop landing is not holding a pattern position or "slot".) Similarly, if an aircraft returns to base when the weather precludes VFR pattern operations, it will either conduct an instrument approach to a full-stop landing or conduct practice instrument approaches if the weather permits. Even though non-FCLP missions are scheduled to avoid FCLP periods on the flight schedule, some aircraft return to the base for pattern work while other aircraft are active in the FCLP pattern or when the tower pattern is full. When this occurs, the desired pattern operations are considered to be "lost". Table 3-8 presents a summary of the NAS Oceana pattern events desired and not performed in each scenario. In the Baseline Scenario, almost all desired pattern events are performed. In ARS-1, the busiest scenario at NAS Oceana, about seven percent of the desired events cannot be not performed, with the F-14 fleet squadrons the most affected group. The "lost" operations total only 4.6 percent of the total operations conducted, however. With six F/A-18 fleet squadrons based at NAS Oceana (ARS-4 and ARS-5), the pattern event completion rate increases to 93.7 percent. Note that almost all of the desired pattern events that are not performed are VFR pattern events.



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Table 3-8: Annual Pattern Event Completions at NAS Oceana

Aircraft	Desired Pattern Events* not Performed					
Group	Baseline	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
F/A-18 Fleet		1,386	1,249	931	770	741
F/A-18 FRS		1,576	1,753	1,607	1,341	1,432
F-14 Fleet	308	1,368	1,269	1,256	1,226	1,115
F-14 FRS	269	937	857	767	805	846
Adversary/Transient	99	251	187	226	196	200
Total Events	676	5,518	5,315	4,787	4,338	4,334
I	Percent of Desired Pattern Events* Performed					
Aircraft	Perc	ent of De	sired Patt	ern Even	ts* Perfor	med
Aircraft Group	Perc Baseline	ent of De	sired Patt	ern Even	ts* Perfor	med ARS-5
1						
Group		ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
Group F/A-18 Fleet		ARS-1 91.8%	ARS-2 91.5%	ARS-3 92.4%	ARS-4 92.2%	ARS-5 92.3%
Group F/A-18 Fleet F/A-18 FRS	Baseline —	ARS-1 91.8% 93.5%	ARS-2 91.5% 92.8%	ARS-3 92.4% 93.4%	ARS-4 92.2% 94.5%	ARS-5 92.3% 94.1%
Group F/A-18 Fleet F/A-18 FRS F-14 Fleet	Baseline — 97.2%	ARS-1 91.8% 93.5% 89.3%	ARS-2 91.5% 92.8% 89.9%	ARS-3 92.4% 93.4% 90.0%	ARS-4 92.2% 94.5% 89.9%	ARS-5 92.3% 94.1% 90.8%
Group F/A-18 Fleet F/A-18 FRS F-14 Fleet F-14 FRS	Baseline — 97.2% 98.4%	ARS-1 91.8% 93.5% 89.3% 94.6%	ARS-2 91.5% 92.8% 89.9% 95.0%	ARS-3 92.4% 93.4% 90.0% 95.6%	ARS-4 92.2% 94.5% 89.9% 95.3%	ARS-5 92.3% 94.1% 90.8% 95.1%

# 3.2.2 NALF Fentress Operations

Figure 3-3 provides the number of annual operations at NALF Fentress for each of the scenarios, and Table 3-9 presents a comparison of the percentage increase of NALF Fentress operations from the Baseline Scenario. The impacts of the F/A-18 squadrons' realignment is significant: a 51 percent increase in operations (about 53,500 operations) in ARS-1 over the baseline and a 40 percent increase in ARS-4 and -5.

Table 3-9: Scenario Comparisons of NALF Fentress Operations

	Percent Greater than Baseline	Daytime Operations	Nighttime Operations
Baseline		38,056	66,612
ARS-1	51.1%	59,602	98,592
ARS-2	43.3%	56,008	94,032
ARS-3	42.1%	55,164	93,592
ARS-4	39.2%	53,408	92,252
ARS-5	39.6%	54,008	92,132

FCLP training is grouped into daytime and nighttime periods, with the first nighttime period occurring no earlier than thirty minutes after sunset. Table 3-9



provides a comparison of the daytime and nighttime (based on sunrise and sunset times) operations for NALF Fentress. For all the scenarios, about 63 percent of the FCLPs are conducted under nighttime conditions. However, only about 38 percent (33 percent for Baseline) are conducted after 2200. Of course, during the summer months, a greater number of FCLPs are flown after 2200 than during the winter months, simply due to the shifts in the sunset time.

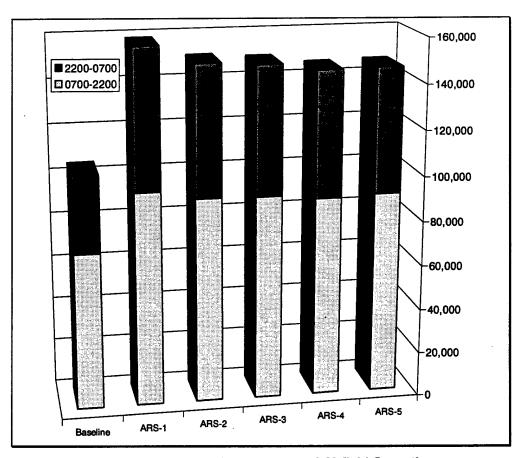


Figure 3-3: NALF Fentress Annual Airfield Operations

Constraints on simulated daytime and nighttime FCLP scheduling at NALF Fentress exist due to airfield closure periods, the shifting of sunrise and sunset times during the year, and rigid block scheduling of Fentress time in NASMOD. The operating hours of NALF Fentress for a normal week are illustrated in Figure 3-4. The shaded regions denote the times that NALF Fentress is closed. Notice that the number of daytime and nighttime hours is dependent on the sunrise and sunset times. As modeled, NALF Fentress is scheduled in 45-minute time blocks; however, some of the open time periods, such as 1230–1630, do not divide evenly into 45-minute blocks and, consequently, fifteen minutes will be unused. During certain periods of the year, up to thirty minutes of nighttime hours are technically "unschedulable" each night. This limitation may not be entirely realistic since squadrons can slide the times at which they arrive at NALF Fentress, can mix with sister squadrons, or can simply use a time block less than 45 minutes. While the



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NASMOD scheduling algorithm attempts to emulate squadron scheduling personnel by searching for available schedule blocks, it cannot dynamically change the duration of schedule blocks during a simulation nor can it deliberately slide a schedule forward (i.e., creating more schedule: blocks) to take advantage of free time available due to missions that complete their FCLP period early. These factors tend to place a greater constraint on the number of missions that may use NALF Fentress during the course of a simulated day.

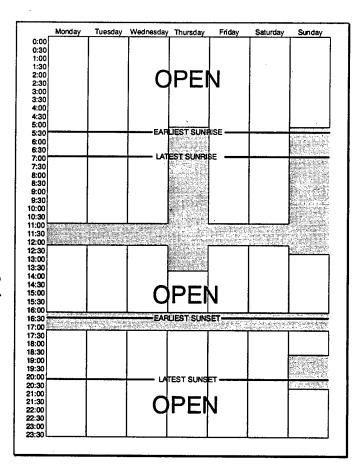


Figure 3-4: NALF Fentress Hours of Operation

# 3.2.3 MCAS Cherry Point Operations

With respect to their effect on MCAS Cherry Point operations, the scenarios can be aggregated into the following three groups:

No Navy F/A-18 squadrons

Baseline, ARS-1, -2, and -4

Three Navy F/A-18 fleet squadrons

ARS-3

Five Navy F/A-18 fleet squadrons

ARS-5

Within each group, the resulting airfield operations are fairly constant among the scenarios. Consequently, the appendix excludes the tabulations for ARS-1, -2, and -4 since their results closely match the Baseline Scenario. Figure 3-5 offers a graphical comparison of the scenarios. Notice that the addition of three F/A-18 fleet squadrons increases the annual operations by about 18 percent while the addition of five F/A-18 fleet squadrons results in a 26 percent increase in annual operations over the Baseline Scenario. The number of night (2200–0700) operations for ARS-3 increases by about 85 percent (3184) over the baseline count, and for ARS-5, the night operations climb by 113 percent (4253 operations). Recall that pattern operations are unavailable after 2300, except for FCLP operations that can extend beyond 2300 as needed.



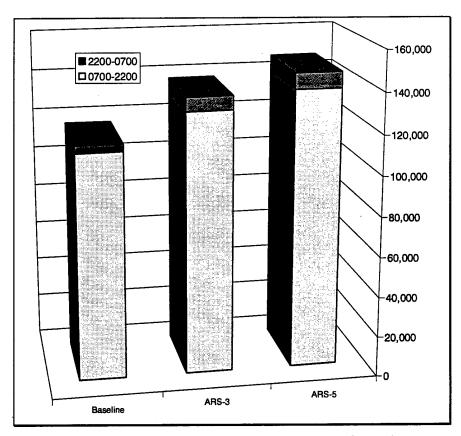


Figure 3-5: MCAS Cherry Point Annual Airfield Operations

Pattern operations at MCAS Cherry Point moderately increase over baseline levels with the realignment of Navy F/A-18 fleet squadrons to this air station in ARS-3 and ARS-5. As shown in Table 3-10 and in Table 3-11, VFR pattern operations increase by 3600 (15 percent) in ARS-3 and about 7000 (29 percent) in ARS-5 over the Baseline Scenario. AV-8B pad operations are only slightly affected, with about 2 percent of the baseline operations "lost" in each of the alternative scenarios due to interactions with FCLP periods and pattern capacity constraints.

Table 3-10: Annual Pattern and Pad Operations at MCAS Cherry Point

	Baseline	ARS-3	ARS-5
VFR Touch-and-Go Operations*	24,200	27,800	31,100
Pad Operations**	18,900	18,500	18,500
Navy FCLP Operations	0	10,700	12,200
Instrument Touch- and-Go Operations	16,400	16,700	17,000

Note: Operations rounded to the nearest 100.



<sup>\*</sup> Includes pad landings from tower pattern

<sup>\*\*</sup> Includes press-ups and pad VTO/Decel/VL

The greatest impact the F/A-18 squadrons on the airfield is from their FCLP pattern operations; these operations represent about 45 percent of the total annual F/A-18 airfield operations in ARS-3 and 37 percent in ARS-5.

Table 3-12 provides the average total taxi duration and delay per sortie. ARS-3 (three Navy F/A-18 fleet squadrons at MCAS Cherry Point) has slightly higher duration and delays, yet these values are minimal (about 30 seconds of additional taxi time, of which about six seconds are delay). These are greater primarily because most of the F/A-18s attempt to refuel at the fuel pits rather than return directly to their ramp (unlike the KC-130s). This refueling strategy

Table 3-11: Percentage Increase in Annual Pattern and Pad Operations at MCAS Cherry Point over the Baseline

	ARS-3	ARS-5
VFR Touch-and-Go Operations	15%	29%
Pad Operations	-2%	-2%
Instrument Touch- and-Go Operations	2%	3%

Table 3-12: Average "Per Sortie" Taxi Times (in minutes) for MCAS Cherry Point

Per Sortie (sum of pre-takeoff and post-landing)								
_	Taxi Duration Taxi Delay							
Baseline	8.0	0.14						
ARS-3	8.4	0.24						
ARS-5	8.6	0.27						

raises the overall airfield average taxi duration.

This heavy usage of the fuel pits by the F/A-18 squadrons is readily apparent from the data provided in Table 3-13. Unlike NAS Oceana, all aircraft that want to use the fuel pits will use them. That is, they are modeled as willing to wait indefinitely. Note that the actual amount of delay is small, just a few minutes; however, in ARS-5, almost one-fifth of all aircraft must wait. These fuel pit usage statistics are highly dependent on the location of the various tenant squadrons' parking locations on the airfield. In none of the scenarios is the actual magnitude of the delay large; however, the impact on taxi operations is an important consideration in deciding where to locate additional squadrons.

Table 3-13: MCAS Cherry Point Annual Fuel Pit Usage and Delay

	Baseline	ARS-3	ARS-5
Total Aircraft Requesting Pit Refueling	15,155	18,962 25% higher than Baseline	21,089 39% higher than Baseline
Aircraft that Must Wait	393	2,785 609% higher than Baseline	3,935 901% higher than Baseline
Percentage of Total Aircraft that Must Wait	2.6%	14.7%	18.7%
Average Wait Prior to Refueling (in minutes)	4.0	6.6	6.9



An aircraft may not able to complete desired airfield pattern or pad operations when it returns to base and one of three conditions exist: (1) the weather (ceiling and/or visibility) precludes VFR pattern operations, (2) the VFR pattern or instrument pattern is at "capacity", or (3) FCLP operations are underway (preclusion depends on the location of the FCLP pattern). Airfield pattern operations are not performed at MCAS Cherry Point due to the same causes as at NAS Oceana. However, the situations that "block" pattern operations and resulting actions that aircraft must take are different at the two bases. Without a parallel runway at MCAS Cherry Point, the instrument and VFR patterns exist on the same runway, and FCLP operations preclude both VFR and instrument pattern operations as well as most pad operations (restrictions on arrivals to and press-ups on certain pads exist during FCLPs).

Table 3-14 shows the pattern operations at MCAS Cherry Point that are desired but not performed in the Baseline, ARS-3, and ARS-5. In the Baseline Scenario just under 97 percent of all desired pattern events are completed. This rate is comparable to that at NAS Oceana in the Baseline Scenario, during which 98.0 percent of all desired pattern events are completed. The introduction of the Navy F/A-18 squadrons to MCAS Cherry Point does not have a dramatic impact on the existing tenant squadrons, which lose approximately 1350 and 1900 events in ARS-3 and ARS-5, respectively. The F/A-18 squadrons at MCAS Cherry Point have a pattern event completion rate about 8 percent lower on average than at NAS Oceana.

Table 3-14: Annual Pattern Event Completions at MCAS Cherry Point

Aircraft		Pattern I t Perform		Percent of Desired Pattern Events* Performed				
Group	Baseline	ARS-3	ARS-5	Baseline	ARS-3	ARS-5		
AV-8 Fleet	724	1,021	1,042	94.8%	92.6%	92.5%		
AV-8 FRS	323	799	792	98.2%	95.6%	95.7%		
EA-6B	258	281	282	91.4%	90.7%	90.6%		
F/A-18 Fleet	_	437	988	_	85.6%	82.6%		
KC-130 Fleet	100	94	117	95.0%	95.3%	94.1%		
KC-130 FRS	49	99	46	98.9%	97.7%	98.9%		
Transient Traffic	4	70	101	99.9%	98.2%	97.4%		
Total Events/ Percentage	1,458	2,801	3,368	96.8%	94.2%	93.4%		

# 3.2.3.1 Qualitative Assessment of the Potential Impacts of a Parallel Runway at MCAS Cherry Point

The NASMOD ARS-5 scenario does not incorporate a parallel runway (Runway 23R), and a quantitative assessment of the impacts of this runway cannot be provided at this time. However, qualitative inference about operational costs and benefits of the parallel runway can be made and are presented below:



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- Airfield operations "lost" due to conflicts with local FCLP missions will be reduced. With a parallel runway, the tower and instrument patterns as well as approaches to two pads are available during FCLP operations on Runway 23R.
- Fewer missions will have their launch times altered as a result of a reduced need for FCLP scheduling deconfliction. Efficiency of scheduling will increase.
- Airfield operations will increase only moderately due to the gain of lost operations. Also, fewer night (after 2200) operations will occur since FCLPs and other missions that conduct pattern operations will not interfere with each other. Consequently, these flights can be scheduled earlier in the evening during the Runway 23 plan versus other plans.
- Interactions between aircraft in the tower and the instrument patterns and aircraft arriving for a full-stop arrival will be reduced during the Runway 23 plan. Mission delay time will decrease as a result. (Recall that the calm wind runway becomes Runway 23 after the parallel runway is added, thereby increasing the time that Runway 23 is the primary runway by about 15 percent).
- The ability of the air station to accommodate higher flows of arriving and departing (Runway 05 plan) aircraft is gained with the parallel runway.
- The only potential cost that can be assessed at this time is the possible loss of the Northeast Harrier pad. If this pad is not relocated, the AV-8 aircraft will have only three pads. It is not certain if operations would be lost without this pad, but some delay may be incurred if the pads are busy.

# 3.2.4 MCALF Bogue Field Operations

The annual number of operations at MCALF Bogue Field are not affected by the relocation of F/A-18 squadrons. The tables in Appendix A offer the annual operations for the Baseline Scenario only. Annually, about 17,300 operations are performed at MCALF Bogue Field, with the AV-8 squadrons conducting about 15,200 (88 percent) of these operations.



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# 3.3 Training Area Utilization

The availability of airspace, ranges, and targets is a significant constraint on the ability of the modeled squadrons to complete their training; as greater numbers of military aviation units compete for a fixed amount of airspace, the utilization must increase. As utilization increases, the ability of squadrons to complete their training requirements in a timely manner is highly dependent on their flexibility to use other ranges or airspace. The training areas are categorized as either exclusive-use or concurrent-use areas, and the discussion of the training areas is presented in these two categories.

Appendix B offers a comprehensive tabulation of the sorties that each training area receives by scenario. Usage in terms of hours is also tabulated for the exclusive-use areas W-72 TACTS range, Navy Dare County Range, BT-11, and BT-9.

#### 3.3.1 Exclusive-Use Training Areas

This section addresses the utilization of the training areas analyzed in this study that are scheduled on an exclusive-use basis: the W-72 TACTS range, the Navy Dare County range, BT-11, BT-9, W-386D, and W-386A/B. The Fort Pickett and Stumpy Point Ranges are also scheduled on an exclusive-use basis, but these areas are modeled with only the NAS Oceana and MCAS Cherry Point demand.

Several of these areas have official ("published") operating hours that are divided into discrete scheduling blocks. Because of the limited operating hours, they have a theoretical maximum number of users/missions that can be accommodated. The range managers for these areas report utilization statistics using a variety of methods. This section does not attempt to duplicate such methods but, instead, offers a single approach for all the areas to facilitate a comparison between scenarios. The formulae used to calculate percentage utilization are as follows:

Scheduled Hours = (Used Hours) + (Short-Notice Canceled Hours)

Percentage Utilization = (Scheduled Hours) (Published Hours)

(Used Hours) + (Short-Notice Canceled Hours)

(Published Hours)

where: Used Hours — schedule (block) hours actually

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Short-Notice — schedule (block) hours canceled
Canceled Hours on too short (late) notification to
allow another user to take

advantage of the available blocks



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Published Hours — the official open hours for the area as specified by the area/range manager

Missions may be canceled on short-notice for reasons such as aircraft mechanical problems, bad weather, or last-minute changes to a squadron flight schedule. While mechanical problems and bad weather are unavoidable by the user, some last minute cancellations reflect inefficiencies in squadron operations planning. NASMOD has the capability to generate random weather events that correspond to actual NAS Oceana region weather patterns and to impose probabilities of mechanical problems for missions. These parameters are used to model the "actof-God" cancellations of missions that truly wanted to use their schedule area block time. However, this study does not attempt to address or model short-notice cancellations due to squadron planning inefficiencies. Because of this modeling approach, a higher efficiency of the usage of scheduled blocks is reflected in the utilization data.

By the above definition of utilization, when an area is reported as having 100 percent utilization for a specific day (or month, year), the interpretation is that every block of time of that area's schedule is reserved. If a mission results in a "no-show", its schedule blocks are unavailable to other users; consequently, these blocks are considered to have been "used" by the squadron that reserved them.

# 3.3.1.1 W-72 TACTS Range

The F-14 and F/A-18 fleet squadrons are the primary users of the TACTS range. For example, SFARP training is performed exclusively in the TACTS range; consequently, the addition of the F/A-18 squadrons can effectively double the demand for range time for SFARP missions alone. This is apparent by an examination of Table B-1 as well as Table 3-15, which gives the increase over the Baseline Scenario that can be expected in the number of sorties to the TACTS range for each of the alternatives. The usage of the W-72 TACTS range for the Navy fleet squadrons is highly dependent on the mission preferences and secondary training areas utilization. For example, the introduction of Navy F/A-18 fleet squadrons, which brings about 3200 annual area sorties in ARS-1, displaces both F-14 fleet squadrons and Air Force sorties to secondary areas. Except for the

FRSs, the aircraft group mix utilizing the TACTS range is highly dependent on the number of F/A-18 squadrons based in the region. Note that the F-14 and F/A-18 FRSs use the TACTS range for local portions of their ACM and FWT syllabi, and most of the associated flight profiles have no secondary training areas. As a result, the FRSs' utilization is relatively constant across the alternative scenarios.

Table 3-15: Percentage Increase In Annual TACTS Range Sorties over the Baseline

RS-1 67% RS-2 58% RS-3 58%
RS-4 46% RS-5 54%



The published TACTS range hours indicate that the range is available 50 hours per week when standard time is in effect and 55 hours per week when daylight savings time is in effect. This suggests that there are a maximum of approximately 2730 hours (5460 30-minute schedule blocks) available each year to users. However, the TACTS range can operate on an overtime basis. In particular, the recently updated training and readiness matrix for the F-14 community includes night air combat training. During the data collection for this study, the F-14 community expressed a desire to use the TACTS range as the preferred location for these missions. Such missions would occur outside the current published range hours and would require that the range be available after dark 113 hours on weeknights during the year for the Baseline Scenario and 35 to 45 hours for the alternative scenarios. Other missions, too, extend beyond published hours during the weekdays; the total hours of range time utilized for the Baseline Scenario is 146 hours, and it ranges from 223 hours to 274 hours for the alternative scenarios.

Squadrons require weekend range time during the simulated year for a total of about six hours for the Baseline Scenario and 15.5 hours to 47.5 hours for the alternative scenarios. This weekend demand typically occurs soon after holiday periods and days of bad weather, indicating that the squadrons need the overtime to "catch-up" rather than a fundamental shortage of available hours on weekdays.

Table 3-16 presents the percent utilization of the TACTS range for each scenario.

ARS-1, which has the all F/A-18 squadrons realigned to NAS Oceana, has the greatest utilization rate, with just over 2275 hours of published range hours scheduled. Total annual scheduled hours in ARS-1 is 2590 hours, which includes hours scheduled on an overtime basis. Interestingly, although the TACTS range in the Baseline is scheduled during normal published hours for more hours than in ARS-4, it is actually scheduled for 25 fewer hours over all than in ARS-4.

Table 3-16: Annual Percentage Utilization of the W-72 TACTS Range

Baseline	78%
ARS-1	83%
ARS-2	80%
ARS-3	77%
ARS-4	76%
ARS-5	76%

Note that the utilization percentages for the alternative scenarios are about the same as for the Baseline although the number of sorties is substantially higher. This implies that, as more Navy squadrons are based in the region, the average number of aircraft participating in each TACTS range event will increase. Also, scheduling inefficiencies and demand peaking from among the squadrons preclude the possibility of scheduling 100 percent of the available hours, and utilization rates of 80 percent to 85 percent may be an upper limit given the current scheduling procedures and requirements.



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#### 3.3.1.2 Navy Dare County Range

The percentage increase in annual sorties with respect to the Baseline Scenario for the Navy Dare County Range is given in Table 3-17. A comparison of the utilization percentages among Tables B-21 through B-26 shows a similar trend. The Navy Dare range is available approximately 3600 hours on weekdays and 400 hours on weekends (excluding holidays/closures). This results in about 16,000 available 15-minute schedule blocks during the year. However, the range is used infrequently on Sundays, except for special events such as carrier exercises. Navy Dare is open on Saturdays from 0800–1600, during which it is used primarily by the Virginia Air National Guard. NAS Oceana- and MCAS Cherry point-based units and other Navy, Air Force, and Marine

Corps units are less frequent weekend users. Most Saturdays are used at a rate of 10 percent to 20 percent of the available hours. There is very little difference between the scenarios on this frequency. Some weekend work is inevitable for squadrons as they try to achieve their training cycle milestones, and this weekend utilization does not indicate a substantial shortage of weekday range hours.

Table 3-17: Percentage Increase in Annual Navy Dare County Range Sorties over the Baseline

ARS-1 ARS-2	37% 33%
ARS-3	33%
ARS-4 ARS-5	25% 33%
70	55,6

In all scenarios, the F-14 fleet squadrons are the major users of the range, with sorties varying from 3024 sorties (57 percent of the annual total) in the Baseline Scenario to 2674 sorties in ARS-2 (38 percent of the total). The F/A-18 fleet squadrons usage varies from 1652 sorties in ARS-1 to 960 sorties in ARS-4. The Air Force annual sorties range from about 1050 in the Baseline and ARS-5 to about 975 in ARS-1 and ARS-3. The Marine Corps sends the fewest sorties to Navy Dare range, with about 70 annual sorties on average.

Some range time outside of the published open range hours is required by the users. These "overtime" hours are primarily the result of demand by carrier-based exercises and training. This demand varies among the alternatives from 18 hours per year (ARS-1) to 26 hours (ARS-3).

Table 3-18 shows the percent utilization of the annual available hours of the Navy Dare County Range for all scenarios. The range hours scheduled jumps by 10 percent (about 410 hours during published available hours) from the Baseline to

ARS-1, and Navy Dare range experiences very little change in percentage utilization from ARS-1 to the other scenarios. With five F/A-18 fleet squadrons based out of the region in ARS-4, the annual utilization is about 3 percent less (about 130 hours) than it is in ARS-1. These observations suggest that utilization of this range is reaching a saturation point for specific blocks of those available from the schedule. That is, there are occurrences in

Table 3-18: Annual Percentage
Utilization of the Navy Dare
County Range

Baseline	57%
ARS-1	67%
ARS-2	66%
ARS-3	66%
ARS-4	64%
ARS-5	65%
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which two or more users request the same range schedule blocks. Often the request for specific range times is dictated by the availability of aircraft within the requesting squadron, which in turn is governed by such factors as squadron maintenance staff and procedures. Consequently, the squadron will attempt to alter the mission launch time first, but if no acceptable alternate times are found, the training area location is altered. The Navy fleet squadrons and Air Force fighter units are much more likely to do this than the FRS or training units. This results in squadrons "flexing" to an alternate training area. For example, Seymour Johnson AFB F-15 fighter unit representatives indicated that if they cannot obtain a Dare County range reservation (either Air Force Dare, which is not modeled, or Navy Dare), they will opt for BT-11. If BT-11 is unavailable, BT-9 is a third choice for some profiles about 10 percent of the time. Table 3-19 gives the percentage of missions that wish to reserve time at Navy Dare but ended up using BT-11 and BT-9. Note that the "flex" percentages for the alternative scenarios are slightly higher than for the baseline.

Table 3-19: Percentage of Missions that "Flex" from Navy Dare County to BT-11 and BT-9

	Base	eline	AR	S-1	AR	S-2	AR	S-3	AR	S-4	AR	S-5
User	BT-11	BT-9	BT-11	BT-9	BT-11	BT-9	BT-11	BT-9	BT-11	BT-9	BT-11	BT-9
Navy	11%	2%	13%	2%	14%	2%	13%	2%	13%	2%	12%	2%
Air Force	18%	9%	19%	15%	22%	12%	18%	13%	20%	9%	15%	14%

User group utilization of the Navy Dare range is complex due to joint training missions, training area flexibility, and Navy F/A-18 fleet squadron basing scenario. The Navy fleet squadrons, the AV-8 fleet squadrons, and the F-15 units from Seymour Johnson AFB can schedule alternative training areas if the Navy Dare range is unavailable. These aircraft groups have the ability to "flex" to areas, such as BT-11 and BT-9. With a greater number of F/A-18 fleet squadrons based in the region, the flexing of F-14 fleet and F-15 missions from Navy Dare range (compared to the Baseline and ARS-4, for example) to alternative areas is also greater.

# 3.3.1.3 Phelps MOA

The Phelps MOA is designed to allow high-altitude bombing on the Dare County ranges. Per a letter of agreement with the Federal Aviation Administration incorporating this MOA, missions may use the MOA only in conjunction with training activities using Dare County, which is officially exclusive-use. Consequently, only one mission should be using the Phelps MOA (northern-half) at a time for training purposes, and that mission should be performing high-altitude ingress. All non-high-altitude bombing missions avoid using this airspace for other types of training.

Annually, 146 F/A-18 high-altitude bombing missions (ARS-4) to 276 missions (ARS-1) are performed at the Navy Dare County range. The F-14 squadrons do not perform high-altitude bombing training locally. These high-altitude bombing



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missions typically involve two to four aircraft reserving the range for one hour for each mission. Phelps MOA is activated annually between 48 hours (ARS-4) and 83 hours (ARS-1) for the alternative scenarios.

#### 3.3.1.4 BT-9 and BT-11

Prior to the realignment of the Navy F/A-18 squadrons, Marine Corps AV-8 and F/A-18 squadrons are the primary users of BT-11. These squadrons, along with Air Force F-16 and A-10 units, have also dominated the usage of BT-9. After realignment, especially in ARS-1, the Navy F/A-18 squadrons have a tremendous impact at BT-11, becoming the single greatest user community in that scenario.

BT-9 tends to be a flex point rather than a primary objective for many bombing missions due to the poor state of this target, its location on a shoal in Pamlico Sound, and the attractive features of other local targets. BT-9 was originally composed of three ship hulks but currently offers only the remains of these hulks. When training over the water at BT-9, pilots may have a difficult time establishing a horizon reference, and close-air-support and forward-air-control missions cannot be supported there. Also, electronic warfare emitters are located at BT-11 along with 16 different targets. Hence, BT-11 and Dare County ranges are generally preferred for most locally performed air-to-ground missions.

Army helicopters from Fort Bragg use BT-9 and BT-11 but at levels much lower than those of the Navy, Marine Corps, and Air Force. For example, the Army utilized only 2.7 hours of range time at BT-11 in FY94 and 33 hours at BT-9. For purposes of this study, Army usage of these targets is considered negligible and is not modeled.

Multi-aircraft strike missions that require an exclusive-use reservation of R-5306A are assumed to be using both BT-9 and BT-11 regardless of whether they actually make runs over the targets. When such missions are in progress, the bombing targets are unavailable to other users and are, consequently, considered as being utilized by the strike mission.

For each alternative scenario, the percentage increase in annual sorties with respect

to the Baseline Scenario for BT-9 and BT-11 is shown in Table 3-20. Note that the increase in the usage of BT-11 is about the same for all the scenarios, with the exception of ARS-4 in which five F/A-18 fleet squadrons are based out of the region. BT-9 experiences greater increases for ARS-1 and -5 because the F/A-18 fleet squadrons are willing to "flex" missions to this target in the event that Navy Dare County or BT-11 are unavailable.

Table 3-20: Percentage Increase in Annual BT-11 and BT-9 Sorties over the Baseline

	BT-11	BT-9
ARS-1	34%	41%
ARS-2	31%	29%
ARS-3	32%	33%
ARS-4	19%	16%
ARS-5	32%	37%

It is important to note that the Marine Corps is the major user of BT-9 and BT-11 in terms of range hours for all the scenarios but that it is almost equal with the



Navy in terms of sorties scheduled at BT-11 in ARS-1 and -5, as shown in Table 3-21 and Table 3-22. With the relocation of the F/A-18 squadrons, the proportion of the range sorties flown by Navy aircraft increases; however, they primarily add to the total number of sorties flown in the area and do not significantly displace Marine Corps or Air Force sorties as is evident by an examination of Tables B-4 and B-5. Also, Navy F/A-18 air-to-ground missions tend to involve more aircraft (sorties) per mission than do AV-8 missions.

Table 3-21: Percentage of BT-11 and BT-9 Sorties Generated by User Community

	Base	eline	AR	ARS-1		ARS-2		ARS-3		ARS-4		ARS-5	
User	BT-11	BT-9											
Navy .	17%	21%	40%	38%	38%	33%	40%	36%	31%	30%	41%	33%	
Marine Corps	56%	39%	40%	32%	41%	34%	40%	32%	46%	35%	40%	33%	
Air Force	24%	32%	18%	24%	19%	26%	18%	26%	21%	28%	17%	27%	
Army/Other	3%	8%	2%	6%	2%	7%	2%	6%	2%	7%	2%	7%	

Table 3-22: Percentage of BT-11 and BT-9 Hours Sceduled by User Community

<del></del>	Base	eline	AR	ARS-1		ARS-2		ARS-3		ARS-4		ARS-5	
User	BT-11	BT-9											
Navv	17%	20%	34%	26%	32%	25%	35%	25%	27%	21%	38%	24%	
Marine Corps	54%	42%	42%	39%	43%	40%	42%	38%	47%	39%	41%	39%	
Air Force	22%	24%	18%	23%	19%	23%	18%	25%	20%	26%	16%	25%	
Army/Other	7%	14%	5%	12%	6%	12%	5%	12%	6%	12%	5%	12%	

BT-9 and BT-11 are each available approximately 3350 hours on weekdays during the year, excluding holidays and other closures. This results in about 10,050 available 20-minute schedule blocks for each range. Tables B-27 through B-32 provide the utilization statistics for BT-11, and Tables B-33 through B-38 for BT-9. Neither of these two targets exhibits symptoms of reaching its capacity. The BT-11 utilization for the Baseline Scenario is 42 percent and varies from 46

percent to 51 percent for the alternatives, as shown in Table 3-23. The BT-9 utilization for the Baseline Scenario is 17 percent and varies from 16 percent to 20 percent for the alternatives. These increases from baseline reflect the "flexing" of missions from the Navy Dare County range to these targets as well as a greater demand for the bombing targets.

Table 3-23: Annual Percentage Utilization of BT-11 and BT-9

	BT-11	BT-9
Baseline	42%	17%
ARS-1	51%	20%
ARS-2	49%	18%
ARS-3	49%	18%
ARS-4	46%	16%
ARS-5	51%	19%

#### 3.3.1.5 W-386A/B and W-386D

Air Force units, specifically the 1st Fighter Wing units at Langley AFB and the Virginia Air National Guard, use W-386A/B as their primary air-to-air training



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area. The Air Force schedules its warning area missions into exclusive-use subareas. Depending on the activities scheduled, Air Force scheduling personnel send flights to different areas of W-386A/B; some flights require the entire area, while other flights have smaller airspace requirements and use subareas of the warning area. Rocket launches and other flight activities by NASA Wallops Flight Facility have the highest scheduling priority in W-386. Over the year, NASA conducts 183 flight activities requiring about 549 hours of W-386A/B and W-386D schedule time.

The Navy conducts air combat maneuvers and air intercept training in W-386A/B and air-to-air gunnery training in W-386D. W-386A/B is primarily a secondary mission training area to W-72 for NAS Oceana-based squadrons. Note that the Navy performs concurrent-use operations in W-386A/B areas not being used by the Air Force. W-386D is scheduled on an exclusive-use basis by all users.

Other aircraft groups utilize W-386A/B, including flights from NAS Norfolk, NAS Patuxent River, other Air Force and Navy bases, and civilian flights that perform support missions. Commercial traffic transits portions of the airspace when they are not in use by the military.

Table 3-24 provides the percentage increase in baseline W-386 sorties resulting from the implementation of the alternative scenarios. The relocation of the F/A-18 squadrons to NAS Oceana results in an

increase in the amount of joint training among the Navy fleet squadrons and, to a lesser degree, with the Air Force. The absolute increases are modest for W-386A/B (on the order of 500 sorties) since the Air Force, whose demand does not vary significantly among the scenarios, accounts for the majority of all the sorties (78 percent for baseline and 72 percent to 75 percent for the alternative scenarios).

Table 3-24: Percentage Increase in Annual W-386A/B and W-386D Sorties over the Baseline

_	W-386A/B	W-386D
ARS-1	12%	27%
ARS-2	11%	22%
ARS-3	14%	21%
ARS-4	9%	18%
ARS-5	12%	22%

The absolute increases are modest for W-386D, as well (on the order of 300 sorties), although the percentage increases are greater. This area is used primarily by F-14 squadrons.

# 3.3.1.6 Fort Pickett Range

The Fort Pickett range is used as an alternative site for close-air-support (CAS) and forward-air-control (FAC) training by the Navy fleet squadrons. Such training is usually performed (or preferred) at Navy Dare and BT-11 due to their closer proximity, and the Fort Pickett range is designated as a flex point because the distance to Fort Pickett reduces the amount of flight time the mission can spend on the target. Occasionally, however, CAS and FAC missions at Fort Pickett are conducted as coordinated training with Army ground units and, at such times, the



Fort Pickett range is selected by the scheduling algorithm as the primary training site.

Table B-13 provides the number of sorties to the Fort Pickett range generated by Navy squadrons based at NAS Oceana and MCAS Cherry Point. Table 3-25

provides the percentage increase in baseline Fort Pickett sorties by NAS Oceana/MCAS Cherry Point-based Navy fleet squadrons resulting from the implementation of the alternative scenarios. Note that the Navy demand on this range varies from 222 sorties in ARS-3 to 72 sorties in the Baseline Scenario. While the total annual number of sorties at the Fort Pickett range was not assessed as part of this study, range managers can expect the Navy demand to approximately triple as a result of the relocation of the F/A-18 squadrons.

Table 3-25: Percentage Increase in Annual Fort Pickett Range Sorties over the Baseline

NAS Oceana/MCAS Cherry Point Demand Only		
ARS-1	194%	
ARS-2	133%	
ARS-3	208%	
ARS-4	167%	
ARS-5	183%	

ARS-3 generates more sorties than ARS-1 to the Fort Pickett range because although the total number of Navy squadrons based in the combined NAS Oceana/MCAS Cherry Point region is the same for these two scenarios, the squadron/airwing assignments are different such that there are more Navy squadrons performing Fort Pickett CAS and FAC missions.

# 3.3.1.7 Stumpy Point Range

The Stumpy Point target in R-5313 consists of a sunken hulk similar to that of BT-9; however, there are no land targets in R-5313. The condition of this target has been very poor the past few years, and is used as a tertiary target for some strike missions by Navy squadrons. There are only 56 Navy sorties (all by F-14 fleet aircraft) to Stumpy Point for the Baseline Scenario. In the alternative scenarios, the usage at Stumpy Point is reduced due to the increase in joint strike missions, which have profiles that do not use this range as an alternative. The Navy demand for Stumpy Point for each scenario is presented in Table B-14.

# 3.3.2 Concurrent-Use Training Areas

This section addresses the utilization of the training areas analyzed in this study that are scheduled on a concurrent-use basis: W-72, W-122, and the military training routes. As discussed in Section 2-4, W-72 and W-122 were subdivided into SOAs after this study was designed. These SOAs may limit the number of simultaneous missions that may use a given warning area; however, for the purpose of this study, no such limits are imposed on the concurrent-use training areas.



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#### 3.3.2.1 W-72

W-72 is a primary training area for NAS Oceana-based squadrons. About onethird of all local F-14 sorties enter W-72, not counting the missions using only the W-72 TACTS range. As shown in Table 3-26, relocating all the F/A-18 squadrons to NAS Oceana (ARS-1) nearly doubles the number of sorties in W-72. The F/A-18 squadrons conduct about 9900 sorties in ARS-1. About 50 percent of the increase (about 4600 sorties on average) is due to the F/A-18 FRS. ARS-2 and -3 generate increases proportional to the number of F/A-18 fleet squadrons located at

NAS Oceana. Those F/A-18 fleet squadrons based at MCAS Cherry Point for ARS-3 and ARS-5 use W-122 as their primary overwater training area. Since W-72 is modeled as concurrent-use, an increase by one user community does not affect the availability of the area to other users, consequently the number of sorties generated by other communities does not vary among the scenarios.

Table 3-26: Percentage Increase in Annual W-72 (exclusive of TACTS range) Sorties over the Baseline

ARS-1 ARS-2 ARS-3 ARS-4	101% 91% 85% 75%
ARS-5	77%

#### 3.3.2.2 W-122

Navy aircraft account for only six to eight percent of the total sorties to W-122, except for ARS-3 and ARS-5 in which Navy sorties account for 17 percent and 23 percent of the total, respectively. . The percentage increase in annual sorties with respect to the Baseline Scenario is given in Table 3-27. The additional sorties in ARS-3 and ARS-5 are generated by the Navy F/A-18 fleet squadrons based at MCAS Cherry Point. Note that about 97 percent of the sorties generated by the MCAS Cherry Point-based F/A-18 squadrons are performed during the daytime. Table B-11 provides the W-122 sortie statistics for each scenario.

Table 3-27: Percentage Increase in Annual W-122 Sorties over the Baseline

ARS-1 ARS-2 ARS-3 ARS-4	2% 1% 13% 0%
ARS-5	21%

Like W-72, the number of sorties generated by other user communities does not vary among the scenarios. The Air Force jets (primarily F-15E aircraft from Seymour Johnson AFB) and Marine Corps squadrons from MCAS Cherry Point generate about 5430 sorties and 5800 sorties, respectively. These two aircraft groups represent about 79 percent of the annual sorties in the Baseline Scenario and 65 percent in ARS-5.

# 3.3.2.3 Military Training Routes

Table B-12 provides the number of annual sorties by NAS Oceana and MCAS Cherry Point squadrons on local MTRs. A number of sorties are allocated to the Other Visual Routes and Other Instrument Routes categories. These categories



aggregate MTR sorties for which it is impossible to identify specific MTR usage; most squadrons try to use a variety of MTRs to provide different low-level mission profiles.

While the MTRs are considered to be concurrent-use areas, there is a theoretical limit to the number of missions that can use an MTR in any period of time because each mission is given an entry time by the scheduling agency for the route to provide for adequate spacing between missions. However, the demand generated by NAS Oceana and MCAS Cherry Point squadrons is far below these limits. For example, VR-1753, the most heavily used MTR by the modeled squadrons, experiences an average of five to six sorties per day. Since many low-level missions are flown as a section (two aircraft), this level of demand equates to an average of two to three missions per day.

# 3.4 Operations Flow Analysis

One purpose for simulating a twelve-month period is to capture the manner in which the level of operations varies or "flows" over the year. The flight schedule for a given squadron can differ significantly from one day to the next. Base loading may change month-to-month as squadrons depart or return from deployments or detachments. The operations discussed in Sections 3.2 and 3.3 provide a summary of the annual effects but do not give an insight as to how these totals are distributed over the twelve months (or 52 weeks), why certain parts of the simulated year are busier (or less busy) than others, and what the busiest day of the year is like. The following sections discuss a variety of operations flow issues.

Note that since flows are highly dependent upon the assumed workup and deployment cycles described in Section 2, changes to those assumptions would result in significant changes to the results presented in this section.

# 3.4.1 Airfield Operations by Month

Figure 3-6 displays the number of monthly airfield operations at NAS Oceana for ARS-1. This scenario was chosen for this analysis because it represents the greatest NAS Oceana-tenant loading condition among the alternative scenarios. The busiest month is April with 22,226 operations, and the least busy month is May with 17,513 operations. The average is 19,784 operations per month, so there is about a 12 percent variation from the average. This emphasizes the fact that no one-month period can give a complete representation of the long-term tempo of operations at the airfield.



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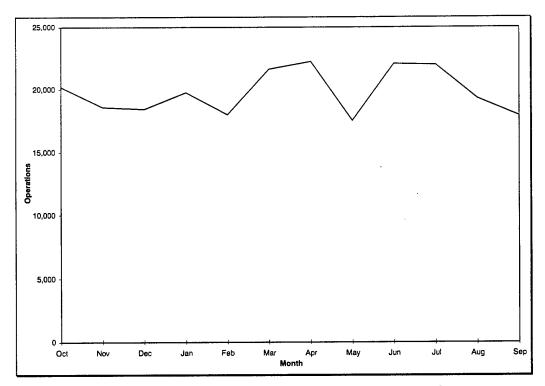


Figure 3-6: Total Monthly NAS Oceana Operations (ARS-1)

March, April, June, and July are busy months for a number of reasons. The primary factor is that there are more squadrons based at home during these periods. As shown in Figure 2-14, all airwings except Atlantic Airwing B are at home during these months (Pacific Airwing H deploys in mid-July). During the peak month of April, Airwing B is deployed and Airwings C and H are embarked during the first half of the month, performing their TSTA III/COMPTUEX exercises. All other airwings are at their home air stations, thereby resulting in a high level of local operations. Operations are low for the month of May, on the other hand, because all but two of the airwings spend part of the month away on detachments or at-sea exercises. FCLPs add a high number of operations, so that months that contain the two weeks prior to at-sea exercises tend to be somewhat higher than average. February and December are low months primarily because they have fewer working days.

Figure 3-7 categorizes the monthly NAS Oceana operations by user/aircraft category. The F/A-18 fleet community generates the most operations six months of the year, the F/A-18 FRS five months, and the F-14 FRS squadron only one month. This figure illustrates the amount of monthly fluctuation that can be expected. For the F-14 and F/A-18 user communities, the monthly operations can vary by 20–35 percent of their averages, the transients can vary by 35–45 percent, and the adversaries by 70–140 percent of their average. These fluctuations emphasize the limitation of calculating an average number of monthly operations.

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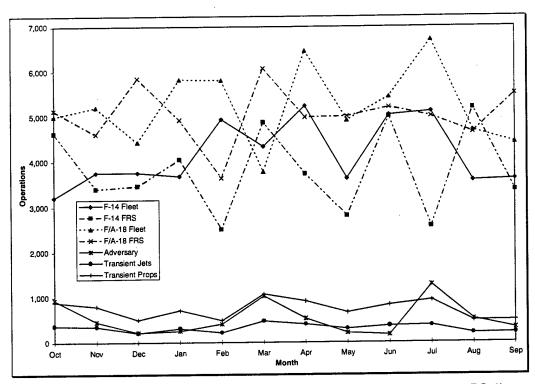


Figure 3-7: Monthly NAS Oceana Operations by Aircraft Category (ARS-1)

It is interesting to note that each of the four categories of major NAS Oceana tenant squadrons — F-14 fleet, F-14 FRS, F/A-18 fleet, and F/A-18 FRS — generates about the same magnitude of operations. The F/A-18 aircraft conduct only a few more operations than the F-14s; however, no single community dominates NAS Oceana operations.

The monthly variation of operations at NALF Fentress is much greater than for NAS Oceana due to the fact that NALF Fentress is used primarily for FCLP training. For fleet squadrons, FCLP training is performed just prior to an at-sea period as required by a given squadron's workup cycle. For fleet replacement squadrons, FCLP training is dictated by class sizes, carrier schedules, and class training phases. Figure 3-8 shows the monthly operations for NALF Fentress for ARS-1. June is the peak month because Airwings C and H are preparing for deployments at the end of the month and the beginning of July. Airwing E is also participating in Sea Trials during June. In addition, the F-14 and E-2 FRSs have student pilots in the FCLP phase of their training. The contributions by each of the aircraft categories are shown in Figure 3-9. July is actually the busiest month for the fleet squadrons because, while Airwing H is finishing its FCLPs in preparation for deployment, Airwings A and G are performing carrier qualifications and Airwing J is preparing for TSTA III. The F-14 and E-2 FRSs are not performing a large number of operations this month. The curves for the three fleet squadron communities (F-14, F/A-18, and E-2/C-2) tend to have the same shape since each of the communities supports the same airwing deployments and have the same atsea exercise timeline.



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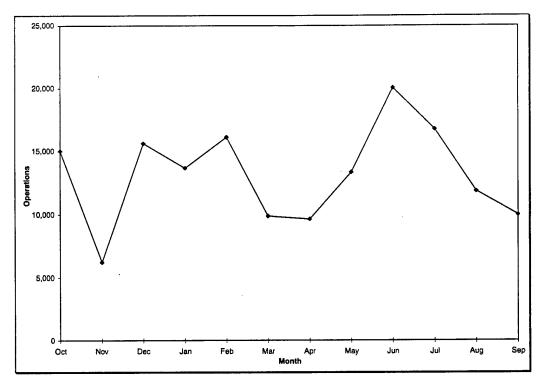


Figure 3-8: Total Monthly NALF Fentress Operations (ARS-1)

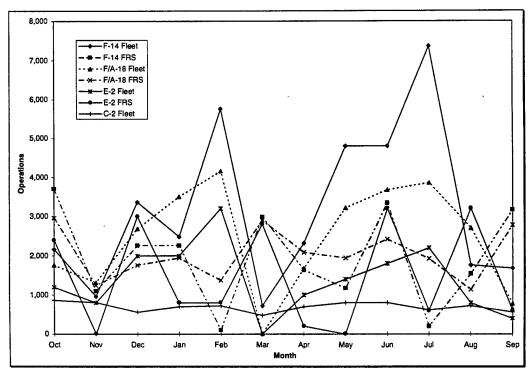


Figure 3-9: Monthly NALF Fentress Operations by Aircraft Category (ARS-1)

The F-14 fleet usage of NALF Fentress diverges somewhat from the other two fleet communities because of the presence of Pacific fleet squadrons, which creates a demand beyond those by the Atlantic airwings.

ARS-5 was chosen for the flow analysis for MCAS Cherry Point since this scenario captures the greatest loading with five Navy F/A-18 squadrons based there. Figure 3-10 displays the number of monthly airfield operations at MCAS Cherry Point for ARS-5. This figure shows two curves. The upper curve reflects the sum of the monthly operations for all the users based at MCAS Cherry Point while the lower curve excludes the operations generated by the five F/A-18 fleet squadrons based there for this scenario.

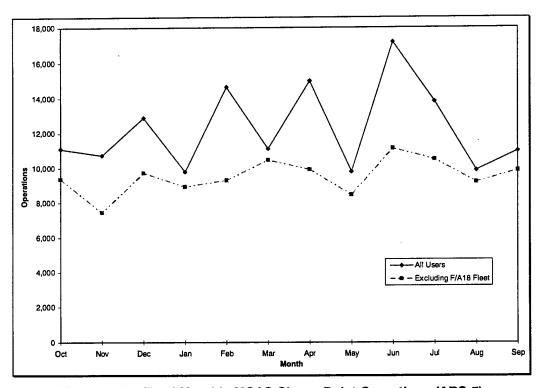


Figure 3-10: Total Monthly MCAS Cherry Point Operations (ARS-5)

The spike in operations for the months of February, April, and June are due, in large part, to F/A-18 FCLP periods. The F/A-18 fleet squadrons for ARS-5 are assigned to Airwings C and A, as shown in Table 2-6. Figure 2-14 shows that Airwing C departs for TSTA III at the end of February, for JTFEX in early May, and for deployment at the end of June. Thereafter, they no longer generate operations at their home base for the remainder of the simulation period. These FCLP cycles result in large monthly variations in airfield operations. Airwing A is on deployment for the first six months and conducts FCLPs one time in the year, in July for preparation for carrier qualifications. May and June are the lowest and highest months, respectively, at 20 percent below and almost 40 percent above the average. These months also represent the greatest monthly change at about 60 percent of the average.



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The flow of operations generated by the Marine Corps squadrons does not vary as much as for the Navy squadrons. Only the EA-6Bs deploy as an entire squadron. The AV-8 fleet squadrons support detachments and deployments with usually only a subset of the squadron, so large variations in airfield operations do not occur as deployments begin or end. Even with the exclusion of the F/A-18 squadrons, the greatest monthly change in operations is from May to June. However, this change represents only 28 percent of the average number of monthly operations.

# 3.4.2 Airfield Operations by Hour

The number of hourly airfield operations varies during a typical weekday as squadrons perform their training missions. For this analysis, non-holiday weekday operation counts are averaged hour-by-hour over the day for the entire simulated year and for the peak month. The annual averages tend to smooth out the daily and monthly variation; consequently, the hour-by-hour variation for the annual average is less than for a given day.

Figure 3-11 compares the number of hourly operations for NAS Oceana averaged over the simulated year and the peak month of April for ARS-1. Most of the operations occur between 0700 and 2400 with prominent daytime surge between 0800 and 1800. During this surge period, there is an average of 68 operations per hour. During this same period in the Baseline Scenario, there is an average of 33 operations per hour. In the late afternoon/early evening there is a lull as daytime missions are completed but nighttime missions have not yet begun. This lull period shifts during the year with sunset, resulting in a somewhat flat average after the 1800 hour on the annual graph. The evening lull is more apparent in the peakmonth average since sunset does not vary greatly during this 30-day window. Most of the nighttime flying occurs in the three-hour period following sunset. The peak-month also exhibits a significant "mid-day dip". This is not unusual in that many squadrons typically schedule a morning and an afternoon flight for a given aircraft. The mid-day period allows maintenance crews to prepare the aircraft for its second flight of the day. This mid-day dip also shifts about somewhat based on the sunrise and sunset times, resulting in a fairly flat curve for the annual average.

Figure 3-12 compares the number of hourly operations for MCAS Cherry Point averaged over the simulated year and the peak month of June for ARS-5. Between the hours of 0800 and 1800, inclusive, there is and average of 41 operations per hour. During this same period in the Baseline Scenario, there is an average of 34 operations per hour. As discussed in the previous section, Airwing C, of which three F/A-18 fleet squadrons are based at MCAS Cherry Point, is preparing for deployment at the end of this month. Consequently, these three squadrons all perform two weeks of FCLPs during this period. Approximately two thirds of FCLPs are conducted under nighttime conditions; the squadrons schedule their first nighttime FCLP period of the day about 30 minutes after sunset, which ranges from 2015 to 2030 during this month. Therefore, the first nighttime FCLP period typically commences at about 2045 or 2100. While the squadrons attempt to



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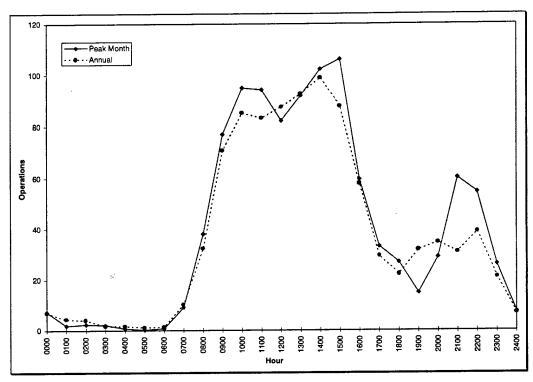


Figure 3-11: Average Hourly NAS Oceana Operations (ARS-1)

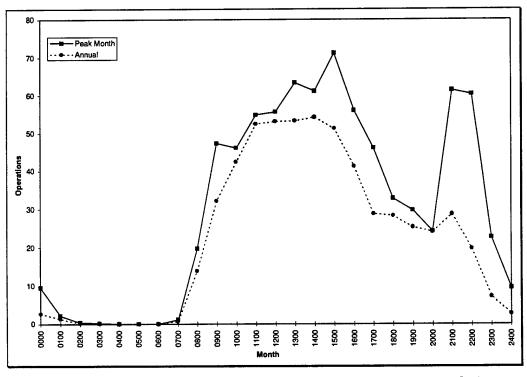


Figure 3-12: Average Hourly MCAS Cherry Point Operations (ARS-5)



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complete their FCLPs as soon as possible on a given night, the training can be expected to extend past the 2300 tower pattern close time. This occurs on 22 days during the simulated year; these days are clustered into five two-week periods. On only four days do the FCLPs extend past 0100; however, the FCLPs never exceed 0200. As stated in Section 2.2.3, no restriction is placed on the scheduling of FCLPs past the 2300 tower pattern close time. On days when nighttime FCLPs are scheduled, the F/A-18 squadrons attempt to shift the entire workday later to minimize the staffing demand on the maintenance crews. While no deliberate effort is made to shift the workday in NASMOD, a variety of modeling parameters do limit the rate at which aircraft can be "turned around" by the maintenance crews and be launched by the squadron. This does result in a shift to later hours as is evident in Figure 3-12 for the peak month. As described earlier, it also accounts for the mid-day dip. As with the graph for NAS Oceana, the annual average smoothes out spikes that would result from a plot of a single day's (or single month's) operations.

#### 3.4.3 Training Area Sorties by Month

The monthly sortie flows in the five primary training areas of this study for the simulated year are shown in Figure 3-13. The black lines indicate ARS-1 and the grey lines indicate ARS-5. The monthly variations are due to changes in demand by the users as they progress through their training workups. W-72 flow data includes the sorties to the W-72 TACTS range. Note that W-72 experiences a greater amount of variation than W-122; this is because the predominant users of

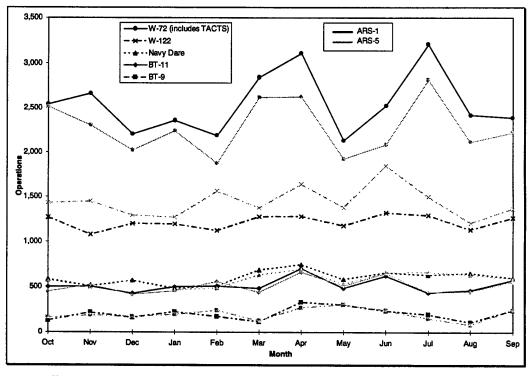


Figure 3-13: Primary Training Area Sorties by Month (ARS-1 and -5)

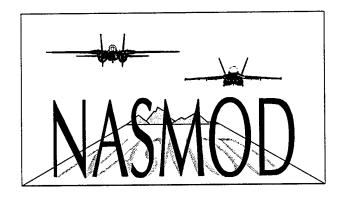


W-72 are NAS Oceana-based squadrons that are subject to workup fluctuations. Navy generated sorties account for a smaller percentage of the total sorties for W-122, thereby imposing a smaller amount of variation.

There is not a significant difference in the usage of Navy Dare, BT-11, and BT-9 between ARS-1 and ARS-5. The usage of W-72 is slightly lower and W-122 slightly higher for ARS-5 as compared with ARS-1. This results from the preference of performing basic over-water training in the closest warning area by the relocated F/A-18 fleet squadrons. All three squadrons in Airwing C and both squadrons in Airwing A are "in phase" in terms of the times of year for which they make demands on each of the training areas. This has the effect of amplifying the additional number of over-water (W-122) sorties for ARS-5 in June and April, for example.

The average number of monthly sorties for W-72 (including the TACTS range sorties) is about 2550 in ARS-1 and 2280 in ARS-5; however, the lowest month is 16 percent below the average for both ARS-1 and ARS-5 while the highest month is 26 percent above the average for ARS-1 and 24 percent above the average for ARS-5. The variation for W-122 is only about 10 percent above or below its average of 1220 monthly sorties. For ARS-5, the averages is about 1450 sorties per month, with the maximum month of June at 28 percent above average and the lowest month of August at 16 percent below average. The variation for Navy Dare is about 20 percent of its average of 600 monthly sorties for both scenarios. The bombing targets experience a significant amount of monthly variation. BT-11 and BT-9 sortie counts can differ from their monthly average by up to 36 percent and 63 percent, respectively, for ARS-1 and 28 percent and 58 percent, respectively, for ARS-5.





# AIR TRAFFIC IN THE DARE COUNTY REGION

# 4 AIR TRAFFIC IN THE DARE COUNTY REGION

This section presents an examination of military and civilian air traffic in the Dare County region, including military operations in R-5314, existing procedures for instrument arrivals to the Manteo/Dare County Regional Airport, the impacts of relocated Navy F/A-18 aircraft, and the potential benefits of enhanced radar coverage in the area.

# 4.1 Traffic Description

The air traffic in the Dare County/R-5314 region below 23,000 feet MSL is composed of military aircraft transiting to and from operating areas, such as R-5314, civilian aircraft on Victor airways, and civilian aircraft operating under visual flight rules (VFR). Civilian airports in the greater area include Norfolk International Airport, Craven County Regional Airport, Manteo/Dare County Regional Airport, Elizabeth City Coast Guard Air Station/Municipal Airport, and First Flight Airport at Kitty Hawk, North Carolina. Figure 4-1 depicts the location of civilian airports and military airfields in the vicinity of Dare County and R-5314.

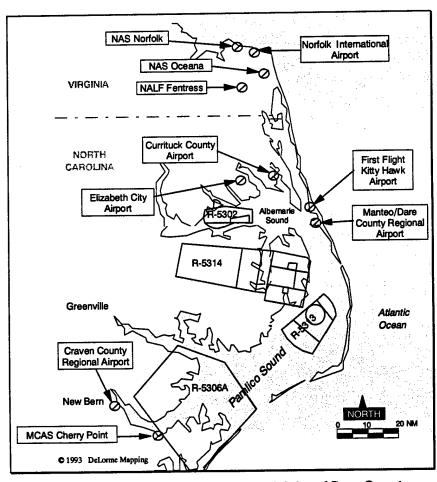


Figure 4-1: Airports/Airfields in the Vicinity of Dare County



4-1

R-5314, located 70 nautical miles to the south of NAS Oceana, is 40 miles by 15 miles in size, with ceilings ranging from 6,000 feet to 20,500 feet MSL. Military aircraft from NAS Oceana and Seymour Johnson AFB are the primary users of R-5314. Other sources of military operations include Pope AFB, MCAS Cherry Point, various Air National Guard units, Shaw AFB, MCAS Beaufort, and naval aircraft carriers operating offshore. The restricted airspace is administered by the Air Force 4th Wing, Seymour Johnson AFB. This restricted use airspace contains two ranges to the east of the Alligator River; the northern half, called the Navy Dare County Range, is scheduled and operated by the Navy's Fleet Area Control and Surveillance Facility, Virginia Capes, and the southern half, named the Air Force Dare County Range, is scheduled and operated by the Air Force 4th Wing. R-5314 is the primary air-to-ground training area for squadrons and units based at NAS Oceana and Seymour Johnson AFB.

Figure 4-2 and Figure 2-11 show R-5314 from planform and side views, respectively.

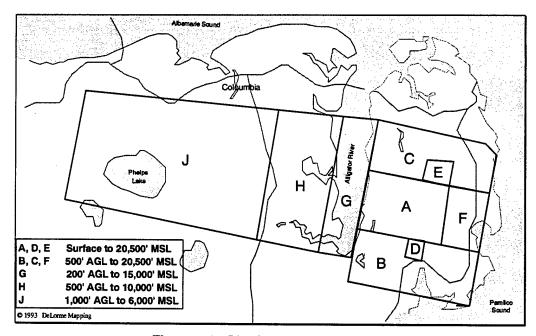


Figure 4-2: Planform View of R-5314

Norfolk Approach Control and NAS Oceana Approach Control provide the primary air traffic control service to aircraft operating in the area. Washington Air Route Traffic Control Center (ARTCC), FACSFAC VACAPES, and MCAS Cherry Point Approach Control also have air traffic control responsibilities in close proximity to the region. The Norfolk/NAS Oceana approach control airspace is depicted in Figure 2-7.

Military aircraft enter R-5314 west of the Alligator River during most flights, as the flight tracks Figure 4-3 indicate. NAS Oceana-based aircraft normally enter and depart R-5314 from the north at 4,000 to 7,000 feet. Note that seven visual



MTRs and two instrument MTRs terminate at or near the edge of R-5314. Many of the aircraft on these routes enter R-5314 to spend time on the ranges at the completion of their training route activity.

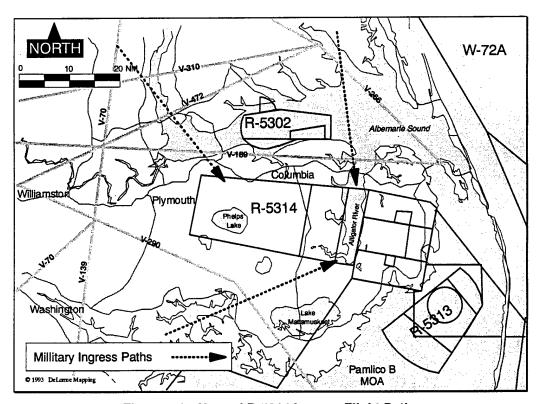


Figure 4-3: Normal R-5314 Ingress Flight Paths

The primary civilian air traffic in the region is composed of general aviation aircraft operating under VFR, with the majority flying below 5,000 feet AGL. Several Victor airways (routes that are part of the low altitude federal airway structure below 18,000 feet MSL) exist in the vicinity of R-5314 and include V-189, V-266, V-472, V-310, V-70, and V-290 (see Figure 4-3). Aircraft utilize the Victor airways under VFR and IFR at all altitudes below 18,000 feet to appropriate floors as determined by air navigation aids and/or terrain restrictions. In addition, civilian traffic must maintain 3 NM lateral separation from restricted airspace boundaries.

# 4.2 Military Operations in the Dare County Ranges and R-5314

As discussed in the previous section, the primary users of R-5314 are units based at NAS Oceana and Seymour Johnson AFB. With the last Navy A-6 squadron at NAS Oceana decommissioning in 1997, the only NAS Oceana-based aircraft utilizing R-5314 will be F-14 aircraft (fleet and FRS) and an occasional F/A-18 aircraft (from the adversary squadron). The two F-15E fighter units and two F-15E fighter training units based at Seymour Johnson AFB heavily utilize R-5314.



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Presently, Navy aircraft rarely use the Air Force range, but Air Force aircraft frequently operate on the Navy range.

Other aircraft that schedule the Navy Dare County Range include F-16 aircraft from the Virginia Air National Guard and Shaw AFB, F/A-18 aircraft from MCAS Beaufort and aircraft carriers during special exercises, AV-8 aircraft from MCAS Cherry Point, and A-10 aircraft from Pope AFB (see Table 4-22). The Air Force Dare County Range also experiences operations from these aircraft types. Scheduling of the ranges is conducted through the appropriate agency as described in the previous section. Most flights, which are normally composed of two or four aircraft, schedule range time in 15- to 60-minute periods.

R-5314 and the Navy and Air Force Dare County ranges are reserved for air-to-ground missions. Specific missions conducted in the area include close-air support, forward-air control, strike, delivery practice, and reconnaissance mapping. During these activities, the pilots are operating under VFR and are responsible for staying within the boundaries of the airspace. According to the airspace and range management personnel of the Air Force 4th Wing, no airspace spillouts, near-misses, or accidents with civilian aircraft have been reported in at least the last five years.

Activation of the restricted airspace is based upon the first and last scheduled missions of the day at either the Air Force or Navy Dare County Range. In general, the restricted airspace is activated (becomes "hot") between 0700 to 0800 in the morning, and is returned to Washington ARTCC at 2400.

# 4.3 Manteo Airport

The Manteo/Dare County Regional Airport is a municipal airport located in the northern portion of Roanoke Island. The majority of the airport's traffic includes helicopters and small fixed-wing aircraft arriving and departing with air tours and advertisement banners and other general aviation traffic. The uncontrolled (no manned control tower) airport has two runways, Runway 05/23 and Runway 17/35. Runway 05/23 is the longest at 4300 feet with 4000 feet landing distance available. The approach end of Runway 05 is about 6.5 NM (runway heading) from the edge of R-5314. The airport has three published instrument approaches — two to Runway 17 and one to Runway 05.

Due to its close proximity to R-5314, aircraft conducting IFR approaches to Runway 05 interact with the northeastern portion of the restricted airspace. Figure 4-4 presents the current, published NDB/GPS RWY 4 approach plate for the Manteo Airport; note that the outer edge of the procedure turn to final is within the 10 NM radius circle shown. (Note that, in July, 1997, the runways were redesignated from those shown in the figure, but the published approach data have not yet been updated. Each runway was redesignated to the next 10 degree mark due to shifting of the magnetic north location over time.) This figure shows the relationship between the airport, the instrument arrival flight track to Runway 05,



and R-5314, and includes a basic diagram of the airport in the lower right-hand corner. Note that VFR arrivals to Runway 05 and IFR and VFR departures and arrivals to the other three runways do not interact with R-5314.

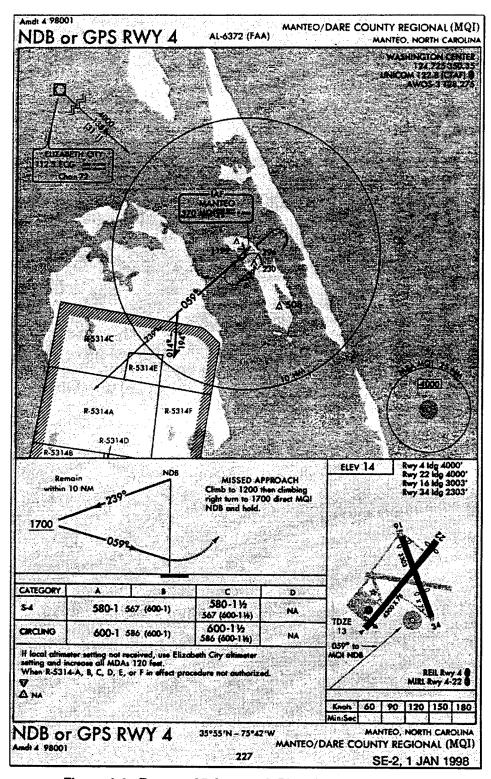


Figure 4-4: Runway 05 Approach Plate for Manteo Airport



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Radar-monitored instrument approaches to Manteo Airport are currently not available since Norfolk Approach Control cannot provide radar services in the area due to lack of radar coverage. Published approach procedures provide aviators with a safe means to arrive at an airport during inclement weather using air navigation aids, such as a nondirectional beacon (NDB) or the global positioning system (GPS). In the case of Runway 05 instrument arrivals, the approach procedure dictates that aircraft make a procedural turn within 10 NM of the Manteo NDB. Federal Air Regulations mandate that all aircraft maintain a 3 NM lateral separation (unless otherwise indicated) from active restricted airspace and that military and civilian nonparticipating aircraft operating under IFR or VFR are not permitted within active restricted airspace boundaries. Therefore, if wind conditions require landing on Runway 05, one of two actions may be taken: (a) R-5314 must be inactive (i.e., released back to the controlling agency, Washington ARTCC in this situation) prior to the commencement of a straight-in instrument approach to Runway 05; or (b) the pilot performs a circling NDB approach to Runway 17 or a circling VOR/GPS approach to Runway 17 with a landing on Runway 05.

Currently, no procedures exist to allow for instrument approaches to Runway 05 when R-5314 is active. Pilots must exercise option (b) in the situation described above. A procedure is currently being developed by the Air Force, Navy, and FAA to facilitate the release of R-5314 back to the FAA to accommodate instrument approaches to Runway 05. If both the Air Force and Navy ranges are clear, then the FAA is notified, R-5314 becomes "cold", and aircraft are cleared to enter the restricted airspace during the approach to Runway 05. If, at the time of request for an instrument approach to Runway 05, one of the ranges is not clear, the civilian aircraft must delay its approach until the activity at the range is complete, all military aircraft have cleared the airspace, and R-5314 is released back to the FAA.

This procedure is not ideal due to potential aircraft delay time, but it does accommodate both Manteo Airport traffic and Dare County Range military operations in a safe manner. Potential coordination conflicts between the Manteo Airport and the Dare County Range under instrument meteorological conditions are expected to decrease after the Navy A-6 aircraft, which have all-weather mission capabilities, are retired from service.

# 4.4 Effect of the Relocation of Navy F/A-18 Squadrons

The arrival of Navy F/A-18 squadrons to NAS Oceana (and/or MCAS Cherry Point) will result in, at most, a 30 percent increase of Navy Dare County Range utilization but with minimal impacts to the length of time each day that R-5314 is active and, accordingly, to civilian aircraft transiting in the vicinity of R-5314.

The Navy F/A-18 mission is part fighter and part attack, a role that borrows elements from the Navy F-14 and A-6 communities. The F/A-18 aircraft's



operating speeds are similar to the F-14, and the Navy F/A-18 squadrons will transit to and from most training areas as do the Navy F-14 squadrons. Unlike the A-6 squadrons, Navy F/A-18 squadrons currently do not conduct all-weather missions. Additionally, the F/A-18 squadrons perform low-level missions (flights utilizing visual MTRs) with a much lower frequency than the A-6 squadrons did. At this time, no new operating or scheduling procedures have been identified as necessary to accommodate the F/A-18 mission and activities at R-5314.

The relocation of the Navy F/A-18 squadrons to NAS Oceana will have a moderate impact on the Navy Dare County Range utilization. In the Baseline Scenario, the average number of sorties per day (weekday) conducting operations in the northern half of R-5314 is 19. In ARS-1, the introduction of 11 F/A-18 fleet squadrons and one F/A-18 FRS to NAS Oceana results in a seven-sortie per day *net* increase (37 percent) to an average rate of 26 sorties per day at the Navy Dare County Range.

# 4.5 Benefits of Enhanced Radar Coverage

The Navy is in the process of determining a site for an air surveillance radar system in northeastern North Carolina. At this time, the Elizabeth City Coast Guard Air Station is the proposed site for installation of this radar. The radar system is proposed to be installed and operational by the end of 1997 with data feeds to FACSFAC VACAPES and Norfolk Approach Control, with Norfolk Approach Control providing the radar services. Radar coverage in this area will offer significant benefits to all civilian and military users. The implementation of a new radar site will provide all airspace users with better service and a safer flying environment while enhancing military training. The primary benefits to the flying community will include:

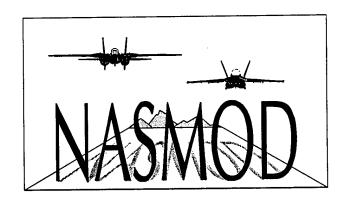
<u>Increased Flight Safety</u>. Improved radar coverage will allow air traffic controllers to provide more efficient positive control of flights on instrument flight plans and offer more effective VFR traffic advisory service.

<u>Enhanced Services to Civil Airfields</u>. With improved radar coverage, at least five additional civil airfields will be able to receive VFR and IFR services below 5,000 feet, including radar separation from other aircraft and vectoring to initial approach fixes for the final approach.

Improved Traffic Flow and Services to Dare County/Manteo Airport. With improved radar coverage, a new instrument approach to Runway 04 at the Dare County/Manteo Airport can be designed and implemented, meeting all current restricted airspace separation criteria.



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# SUMMARY AND CONCLUSIONS

#### 5 SUMMARY AND CONCLUSIONS

This study examines the capability of NAS Oceana and MCAS Cherry Point, including NALF Fentress, MCALF Bogue, and the local airspace and ranges, to accommodate the prospective levels of operations resulting from the implementation of BRAC 95-related decisions. This analysis is accomplished through the use of a fast-time computer simulation model, NASMOD, by modeling the proposed tenant squadrons and other airspace and range users with their training requirements over a simulated year. This study also examines the issues related to the proximity of the Manteo/Dare County Regional Airport to R-5314.

The NASMOD model of NAS Oceana and MCAS Cherry Point was developed with extensive coordination between the analysts and military personnel and encompasses all the relevant airfield, airspace, and squadron attributes required to characterize the elements under the scope of this study.

Five alternative relocation scenarios (ARS) were identified by the Navy for analysis. Each scenario represents an alternative base-loading squadron mix in a future year (i.e., FY99) following the relocation and realignment of the modeled squadrons. A baseline scenario was analyzed with which to compare the alternatives.

The tenant mix for the Baseline Scenario is as follows:

NAS Oceana	MCAS Cherry Point
7 F-14 Atlantic fleet squadrons	3 AV-8 fleet squadrons
4 F-14 Pacific fleet squadrons	1 AV-8 FRS
1 F-14 FRS	4 EA-6B squadrons
1 F/A-18 adversary squadron	1 KC-130 fleet squadron
	1 KC-130 FRS

The alternative scenarios specify the location of the Atlantic F/A-18 squadrons as follows:

	ARS-1	ARS-2	ARS-3	ARS-4	ARS-5
NAS Oceana	11 + FRS	9 + FRS	8 + FRS	6 + FRS	6 + FRS
MCAS Cherry Point			3		5
MCAS Beaufort		2		5	

The impacts of Navy squadron realignment alternatives on MCAS Beaufort and that air station's surrounding training areas is not examined in the study.

In the Baseline Scenario, each modeled squadron and unit is able to complete its training with very little difficulty. Delays, scheduling adjustments and postponements, and incomplete airfield operations are minimal. The training areas, although significantly utilized, are able to accommodate users' demand adequately; however, some missions occasionally "flex" to alternate training areas due to scheduling conflicts.

With the realignment of the Navy F/A-18 squadrons from NAS Cecil Field to NAS Oceana and MCAS Cherry Point (ARS-3 and -5), operation levels at airfield and



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local training areas increase significantly. With the increases in operations comes a cost to existing tenant squadrons (as well as the realigned squadrons) in terms of "lost" airfield operations (i.e., desired return-to-base pattern operations not performed due to full patterns, weather, or FCLP periods underway), more frequent usage of secondary and alternate training areas, an increase in adjusted and postponed missions, and flight launch times more frequently "pushed" later in the day or later in the evening. With more users in the region and more demand placed on limited training area resources, the scheduling of flight operations becomes more complex. These impacts of the increase in operations are costs to the users, air traffic control, and range schedulers in the area.

On an annual basis, the increase in flight operations from the realignment of the Navy F/A-18 squadrons does not affect the ability of the squadrons to complete their overall flight requirements. Although increases for most aircraft groups in adjusted and postponed flights do occur in the alternative scenarios, no significant postponements in flight scheduling are experienced. Some adjustments are made to alternative or less-preferred training areas for most squadrons. Also, shifting of flight launch times due to adjusted training area selections affect squadron aircraft allocation and overall scheduling efficiency.

Significant increases of airfield operations at NAS Oceana occur with the realignment of the F/A-18 squadrons. In ARS-1, airfield operations increase by about 120 percent (about 128,600 operations) above baseline levels. The F/A-18 FRS contributes 47 percent of the increase. NALF Fentress experiences an increase of 51 percent in airfield operations. As a result of increased operations, taxi delay, a component of the mission delay, increases by 90 percent, rising from 1.0 minute in the Baseline to 1.9 minutes per sortie on average for ARS-1. Due to increased interactions and pattern congestion, completion of desired return-to-base pattern operations drops from 98.0 percent (average over all aircraft groups) in the Baseline Scenario to 92.8 percent in ARS-1. The F-14 fleet squadrons experience the largest decrease, from 97.2 percent in the Baseline Scenario to 89.3 percent in ARS-1.

Airfield operations at MCAS Cherry Point increase moderately in ARS-3 and -5 (18 percent and 26 percent, respectively) as a result of relocation of Navy F/A-18 fleet squadrons. Night (2200 to 0700) operations increase sharply — by 85 percent in ARS-3 and 113 percent in ARS-5. The F/A-18 fleet squadrons conduct about 10,700 FCLP operations annually in ARS-3 at MCAS Cherry Point. Note that MCALF Bogue Field operations, which total about 17, 300 annually, are not affected by Navy F/A-18 squadron operations.

Interactions increase only slightly from baseline levels with the F/A-18 squadrons at MCAS Cherry Point. The average taxi delay increases from the Baseline Scenario by about six seconds per sorties in ARS-3 and eight seconds in ARS-5. Taxi delay at MCAS Cherry Point is much lower on average (0.14 minutes in the Baseline) than at NAS Oceana (60 seconds). The pattern event completion rate drops from 96.8 percent to 94.2 percent and 94.4 percent in ARS-3 and ARS-5, respectively. Compared to the number of "lost" operations at NAS Oceana, the



operations "lost" at MCAS Cherry Point are much lower (about 70 percent lower for ARS-3).

Navy F/A-18 squadrons have a significant impact on local training area operations, especially in W-72, the W-72 TACTS range, Navy Dare County Range, and BT-11. The F/A-18 squadrons utilize almost all of the local areas currently used by the aircraft communities at NAS Oceana and MCAS Cherry Point. In W-72, annual sorties double after the realignment of F/A-18s to NAS Oceana, increasing from about 11,400 in the Baseline Scenario to 22,800 in ARS-1. Even in ARS-4 (the scenario with the fewest Navy F/A-18 squadrons in the region), W-72 sorties increase by 44 percent to 20,200 for the simulated year.

The W-72 TACTS range and Navy Dare County Range approach capacity limits with the realignment of F/A-18 squadrons. The TACTS range in ARS-1 is utilized 83 percent (of its published available hours), with over 8000 sorties using the area annually. In the Baseline Scenario, the TACTS range experiences 4000 annual sorties and has a utilization rate of 78 percent. The number of sorties utilizing the TACTS range increases by 67 percent in ARS-1 (the greatest increase from the baseline of any alternative scenario) to 46 percent in ARS-4 (the smallest increase).

Note that the utilization percentages for the alternative scenarios are about the same as for the Baseline although the number of sorties is substantially higher. This implies that, as more Navy squadrons are based in the region, the average number of aircraft participating in each TACTS range event will increase. Also, scheduling inefficiencies and demand peaking from among the squadrons preclude the possibility of scheduling 100 percent of the available hours, and utilization rates of 80 percent to 85 percent may be a practical upper limit given the current scheduling procedures and requirements.

Navy Dare County Range also experiences high levels of utilization after the realignment. The annual sorties at Navy Dare increase by 37 percent in ARS-1, 33 percent in ARS-2, -3, and -5, and 25 percent in ARS-4. The variation of Navy Dare's utilization rate in the alternative scenarios is very small: 67 percent in ARS-1 and 64 percent in ARS-4. As demand for the area is reduced (e.g., ARS-1 to ARS-4 or ARS-5), the utilization rate does not decrease by a proportional amount. This observation, coupled with the fact that the training area selection "flexing" from Navy Dare increases in the alternative scenarios, suggests that as Navy Dare's utilization rate approaches 70 percent, the range approaches "capacity," or saturation.

The increases in annual sortie rates at BT-9 and BT-11 are on the same order in all scenarios as those experienced at Navy Dare range. BT-11 sorties increase by 34 percent in ARS-1 and only 19 percent in ARS-4 from baseline levels. Similarly, BT-9 annual sorties increase by 41 percent in ARS-1 and 16 percent in ARS-4 from the Baseline Scenario. From a schedule capacity point-of-view, BT-11 has the ability to accommodate increased operations after the realignment of the Navy F/A-18 squadrons (in any scenario). BT-11's utilization rate is approximately 50



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percent for all scenarios (42 percent in the Baseline Scenario). On average, BT-9 is only utilized about 20 percent of its available hours.

W-122 is significantly affected only in ARS-3 and -5, in which F/A-18 fleet squadrons are based at MCAS Cherry Point. Annual sorties increase by 13 percent and 21 percent in ARS-3 and ARS-5, respectively. Air Force jets (primarily F-15E aircraft from Seymour Johnson AFB) and Marine Corps squadrons from MCAS Cherry Point dominate the usage of W-122, annually generating about 5430 sorties and 5800 sorties, respectively. These two user groups represent about 79 percent of the annual sorties in the Baseline Scenario and 65 percent in ARS-5.

The local MTRs are modeled with MCAS Cherry Point and NAS Oceana squadrons' demand only. These routes are scheduled only to avoid multiple flights from beginning a route at the same time. Capacity of the local route system is not a constraint on squadron operations. The local MTRs experience about 3530 sorties annual in the Baseline Scenario. In ARS-1, about 5060 aircraft — an increase of 43 percent — perform operations on the MTRs, and in ARS-4, about 4680 sorties conduct flights on MTRs, representing a 32 percent increase in operations. The most utilized MTR in the area in ARS-1 experiences 5 to 6 sorties per day on average.

Monthly and hourly operation flows are examined at MCAS Cherry Point (ARS-5), NAS Oceana (ARS-1), and at five training areas (ARS-1 and ARS-5). The busiest month at NAS Oceana is April with about 22,200 operations. At NALF Fentress, the peak month is June with about 20,000 operations performed; during the least busy month at Fentress, about 6000 operations are conducted. The variation in monthly operations is extreme compared to the monthly operations at NAS Oceana, which reflects the FCLP schedule.

At MCAS Cherry Point, airfield operations in ARS-5 vary from a low of 9800 in January to a peak of over 17,100 operations June. With the realignment of F/A-18 fleet squadrons, the month-to-month variations in ARS-5 are much greater than in the Baseline Scenario.

Annual hourly airfield operations between 0800 to 1900, representing the average day's "surge" period, average 33 operations per hour at NAS Oceana in the Baseline Scenario and 68 operations per hour in ARS-1. Similarly, operations during this same period at MCAS Cherry Point average 34 operations per hour in the Baseline Scenario and 41 operations per hour in ARS-5.

An analysis of military and civilian traffic in the Dare County region of the potential impacts due to the increase in operations from the realignment of the Navy F/A-18 squadrons on the civilian traffic in the area was performed. Although the number of sorties to and from R-5314 increases by 37 percent in ARS-1 and 25 percent in ARS-4 over the baseline levels, the amount of hours that the range is utilized increases by at most 10 percent in any of the alternative scenarios. In ARS-1, the introduction of 11 F/A-18 fleet squadrons and one F/A-18 FRS to NAS Oceana results in a seven-sortie-per-day *net* increase (37 percent) to an



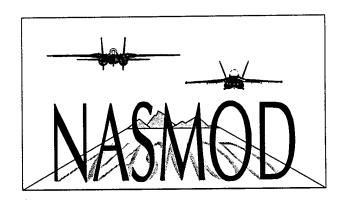
average rate of 26 sorties per day at the Navy Dare County Range. Furthermore, the amount of time that the range is "open" per day will only slightly increase in order to accommodate special operations. No significant impact on civilian traffic is caused by the additional R-5314 operations resulting from the realignment of Navy F/A-18 squadrons to the region.

The Navy is in the process of determining a site for an air surveillance radar system in northeastern North Carolina. Radar coverage in this area will offer significant benefits to all civilian and military users. The implementation of a new radar site will provide all airspace users with better service and a safer flying environment while enhancing military training. The primary benefits to the flying community will include: increased flight safety, enhanced services to civil airfields, and improved traffic flow and services to Dare County/Manteo Airport.



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# APPENDIX A: AIRFIELD UTILIZATION

## APPENDIX A: AIRFIELD UTILIZATION

This section contains tables of airfield operations, flight track operations, and NAS Oceana Lightship approach data for selected scenarios. MCAS Cherry Point and MCALF Bogue Field airfield operation tables are not included for ARS-1, -2, and -4. The operation levels and type distributions of these scenarios do not differ significantly from the scenarios with the same base loading at MCAS Cherry Point. To determine the MCAS Cherry Point and MCALF Bogue Field airfield operations for ARS-1, -2, and -4, see the Baseline tables.

In reviewing and comparing quantitative results, note that, unless otherwise discussed in the text (Section 3), each of the alternatives should be compared against the baseline scenario. Since the results are dependent upon airwing compositions as well as base loading, comparisons between the alternative scenarios may result in misleading conclusions. Some variation is to be expected due to random behavior designed into the model.

# A.1 Basic Airfield Operations

Pad Landing

Two types of airfield operations tables are presented: basic and flight track. The basic airfield operations are those commonly used by ATC personnel in counting the number of actions during each airfield event. They are defined as follows:

Departure	One aircraft taking off from a runway from a full
	stop. One operation.

Full Stop Visual	One aircraft performing a full-stop landing under
Landing	VFR from either the visual touch-and-go pattern, or

a straight-in approach. One operation.

Full Stop Instrument	One aircraft performing a full-stop landing using a
Landing	GCA or other instrument landing system. One
	operation.

One aircraft performing an approach to a vertical landing on a pad. One operation.

One aircraft performing a visual approach followed Visual Touch-and-Go/ by either a takeoff (in a touch-and-go) or a missed Low Approach approach. Two operations.

One aircraft performing an instrument approach Instrument Touch-and-Go/ followed by either a takeoff (in a touch-and-go) or a Low Approach missed approach. Two operations.

Field Carrier Landing Similar to a visual touch-and go event. Two **Practice** operations.



C - 141A-1 Press-Up A vertical takeoff from a pad followed by hovering

maneuvers and a vertical pad landing. Two

operations.

Pad Vertical Takeoff

to Pad Landing

Circuit

One aircraft performs a vertical takeoff from a pad, accelerates to forward flight speed around a pattern, and conducts an approach to a vertical pad landing.

Two operations.

Specific operations at MCALF Bogue Field include:

Field Carrier Landing Pattern operations with approaches to a simulated

Practice ship deck. Two operations.

Forward Base Operations Pattern operations with approaches to the runway.

Two operations.

Expeditionary Airfield Arrivals, departures, and pattern operations during

Operations expeditionary airfield demonstrations and exercises.

Transient aircraft airfield operations are performed by aircraft not based at the specific air station. The transient aircraft may perform a full-stop landing and remain at the base for several hours or several days. Some transients conduct approaches and depart out of the local operating area. The sources of these transient aircraft are as diverse as the number of military bases throughout the United States, but certain aircraft types perform the majority of operations in each transient group. The transient aircraft groups are described below:

#### **NAS Oceana**

Transient Jet Primarily Navy jets such as F-14, S-3, and F/A-18

aircraft, but includes Lear jets and transports.

Transient Prop Primarily E-2, C-2, T-34, and C-130 aircraft.

**MCAS Cherry Point** 

Transient Jet Includes a wide variety of military jets such as F-15.

F-16, and F/A-18 aircraft.

Transient Prop Includes C-12, E-2, and C-130 aircraft.

Transient Heavy Primarily C-141, C-5, and KC-10, aircraft.

Transient Large Primarily C-9 aircraft.

Transient Helicopter Includes H-46, H-53, UH-1, AH-1, AH-64, and

OH-58 helicopters.

MCALF Bogue Field

Marine Corps Helicopter Primarily MCAS New River-based CH-46, CH-53,

UH-1, and AH-1 helicopters.



Other Military Jet

Primarily Marine Corps F/A-18 aircraft.

Other Military Helicopter

Includes a variety of Army and foreign military

helicopters.

Table A-1: Annual Basic Operations at NAS Oceana and NALF Fentress for the Baseline Scenario

			A		
Aircraft	Operation Type		Day	Night	Total
Category	' ''		0700-2200	2200-0700	
F-14 Fleet	Departure		12,358	867	13,225
r-14 Fieel	Full Stop Visual Landing		11,360	1,340	12,700
	Full Stop Instrument Landing		399	115	514
	Visual Touch-and-Go/Low Approach		19,320	1,076	20,396
	Instrument Touch-and-Go/Low Approach		526	44	570
	Field Carrier Landing Practice		o	o	(
	Field Carrier Landing Fractice	TOTAL	43,963	3,442	47,405
		101712	6,627	320	6,947
F-14 FRS	Departure		5,953	355	6,308
	Full Stop Visual Landing		309	330	639
	Full Stop Instrument Landing		26,502	954	27,456
	Visual Touch-and-Go/Low Approach		3,774	1,460	5,234
	Instrument Touch-and-Go/Low Approach		3,774	0,-00	0,20
	Field Carrier Landing Practice			3,419	46.584
		TOTAL	43,165	13	839
Adversary	Departure		826	2	828
	Full Stop Visual Landing	İ	826	_	6
	Full Stop Instrument Landing		5	0	436
	Visual Touch-and-Go/Low Approach		436	0	168
	Instrument Touch-and-Go/Low Approach		168	0	
		TOTAL	2,261	15	2,276
Transient Jet	Departure		947	20	967
	Full Stop Visual Landing		710	14	724
	Full Stop Instrument Landing		241	2	243
	Visual Touch-and-Go/Low Approach		1,050	28	1,078
	Instrument Touch-and-Go/Low Approach		806	30	830
		TOTAL	3,754	94	3,84
Transient Prop	Departure		1,611	31	1,64
· · · · · · · · · · · · · · · · · · ·	Full Stop Visual Landing		1,155	16	1,17
	Full Stop Instrument Landing		463	8	47
	Visual Touch-and-Go/Low Approach		2,838	52	2,89
	Instrument Touch-and-Go/Low Approach		2,568	42	2,61
		TOTAL	8,635	149	8,78
		AIRFIELD TOTAL	101,778	7,119	108,89
NALF Fentress		1	_		
				Airfield Operations	Total
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
F-14 Fleet	Field Carrier Landing Practice		25,074	13,566	38,64
			45.040	7.004	22.20

Day 0700-2200 25,074	Night 2200-0700	Total
25 074	40.500	
20,014	13,566	38,640
15,946	7,334	23,280
9,743	7,057	16,800
11,641	5,959	17,600
7,772	576	8,348
70,176	34,492	104,668
	15,946 9,743 11,641 7,772	15,946 7,334 9,743 7,057 11,641 5,959 7,772 576



Table A-2 Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-1

Aircraft	Operation Type		Airfield Operations  Day Night Total		
Aircraπ Category	Operation Type		Day	Night	ı otal
F-14 Fleet	Departure		0700-2200	2200-0700	10.05
r•14 rieet			12,181	1,169	13,35
	Full Stop Visual Landing		11,302	1,502	12,80
	Full Stop Instrument Landing		365	171	53
	Visual Touch-and-Go/Low Approach		20,772	994	21,76
	Instrument Touch-and-Go/Low Approach		456	56	51:
	Field Carrier Landing Practice	TOTAL	640	240	88
F-14 FRS	Denoture	TOTAL	45,716	4,132	49,84
r-14 rno	Departure		6,539	425	6,96
	Full Stop Visual Landing		5,921	393	6,31
	Full Stop Instrument Landing		265	385	65
	Visual Touch-and-Go/Low Approach		25,274	918	26,19
	Instrument Touch-and-Go/Low Approach		3,732	1,500	5,23
	Field Carrier Landing Practice		0	180	18
F/4 40 F		TOTAL	41,731	3,801	45,53
F/A-18 Fleet	Departure		14,330	1,298	15,62
	Full Stop Visual Landing		12,556	1,891	14,44
	Full Stop Instrument Landing		851	342	1,19
	Visual Touch-and-Go/Low Approach	İ	24,342	1,914	26,25
	Instrument Touch-and-Go/Low Approach		2,124	800	2,92
	Field Carrier Landing Practice		1,180	1,080	2,26
		TOTAL	55,383	7,325	62,70
F/A-18 FRS	Departure		8,059	479	8,53
	Full Stop Visual Landing		6,838	667	7,50
	Full Stop Instrument Landing	İ	689	344	1,03
	Visual Touch-and-Go/Low Approach		35,822	2,412	38,23
	Instrument Touch-and-Go/Low Approach		4,406	654	5,06
	Field Carrier Landing Practice		160	0	16
		TOTAL	55,974	4,556	60,53
Adversary	Departure		2,262	71	2,33
	Full Stop Visual Landing	1	2,316	0	2,31
	Full Stop Instrument Landing		16	1	1
	Visual Touch-and-Go/Low Approach		1,476	0	1,47
	Instrument Touch-and-Go/Low Approach		166	0	16
		TOTAL	6,236	72	6,30
Fransient Jet	Departure	1	947	20	96
	Full Stop Visual Landing	ĺ	709	14	72
	Full Stop Instrument Landing	ĺ	242	2	24
	Visual Touch-and-Go/Low Approach		1,004	22	1,02
	Instrument Touch-and-Go/Low Approach		804	30	83
		TOTAL	3,706	88	3,79
ransient Prop	Departure		1,634	30	1,66
	Full Stop Visual Landing	ļ	1,173	16	1,18
	Full Stop Instrument Landing		467	8	47
	Visual Touch-and-Go/Low Approach		2,778	52	2,83
	Instrument Touch-and-Go/Low Approach		2,572	42	2,61
	1	TOTAL	8,624	148	8,77

		A	Airfleid Operations			
Aircraft Category	Operation Type	Day 0700-2200	Night 2200-0700	Total		
F-14 Fleet	Field Carrier Landing Practice	20,508	17,652	38,160		
F-14 FRS	Field Carrier Landing Practice	14,802	8,658	23,460		
F/A-18 Fleet	Field Carrier Landing Practice	17,629	11,711	29,340		
F/A-18 FRS	Field Carrier Landing Practice	17,187	7,299	24,486		
E-2 Fleet	Field Carrier Landing Practice	7,873	8,927	16,800		
E-2 FRS	Field Carrier Landing Practice	10,291	7,309	17,600		
C-2 Fleet	Field Carrier Landing Practice	7,860	488	8,348		
	AIRFIELD TOTA	L 96,150	62,044	158,194		



Table A-3: Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-2

			Airfield Operations		
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
-14 Fleet	Departure	l	12,087	1,164	13,2
	Full Stop Visual Landing	l	11,257	1,450	12,7
	Full Stop Instrument Landing		357	177	5
	Visual Touch-and-Go/Low Approach		20,568	940	21,5
	Instrument Touch-and-Go/Low Approach		474	64	5
	Field Carrier Landing Practice		976	320	1,2
		TOTAL	45,719	4,115	49,8
-14 FRS	Departure		6,495	460	6,9
	Full Stop Visual Landing		5,895	418	6,3
	Full Stop Instrument Landing		282	360	€
	Visual Touch-and-Go/Low Approach		25,470	890	26,3
	Instrument Touch-and-Go/Low Approach		3,682	1,538	5,2
	Field Carrier Landing Practice		50	130	1
	Field Carrier Landing Fractice	TOTAL	41,874	3,796	45,€
F/A-18 Fleet	Departure	101712	12.048	1,024	13.0
-/A- to rieet	1 '		10,592	1,478	12.0
	Full Stop Visual Landing		700	315	1,0
	Full Stop Instrument Landing		20.996	1,760	22.7
	Visual Touch-and-Go/Low Approach	1	1,854	658	2,5
	Instrument Touch-and-Go/Low Approach		140	924	1,0
	Field Carrier Landing Practice	TOTAL	46,330	6.159	52,4
		TOTAL	8,137	416	8,5
F/A-18 FRS	Departure		, ,	652	7,5
	Full Stop Visual Landing	ľ	6,907	308	7,0
	Full Stop Instrument Landing		686		_
	Visual Touch-and-Go/Low Approach		35,902	2,190	38,0
	Instrument Touch-and-Go/Low Approach		4,520	570	5,0
	Field Carrier Landing Practice		320	80	4
_		TOTAL	56,472	4,216	60,6
Adversary	Departure		1,962	55	2,0
	Full Stop Visual Landing		2,006	0	2,0
	Full Stop Instrument Landing		10	1	
	Visual Touch-and-Go/Low Approach		1,530	0	1,5
	Instrument Touch-and-Go/Low Approach		168	0	1
		TOTAL	5,676	56	5,7
Transient Jet	Departure		946	21	9
	Full Stop Visual Landing		710	14	7
	Full Stop Instrument Landing		241	2	2
	Visual Touch-and-Go/Low Approach		1,020	22	1,0
	Instrument Touch-and-Go/Low Approach	1	804	30	ε
		TOTAL	3,721	89	3,8
Fransient Prop	Departure		1,638	31	1,6
· r	Full Stop Visual Landing		1,183	16	1,1
	Full Stop Instrument Landing	1	462	8	4
	Visual Touch-and-Go/Low Approach	1	2,878	52	2,9
	Instrument Touch-and-Go/Low Approach	1	2,572	42	2,6
	motoricity today and doject / pproduct	TOTAL	8,733	149	8.8
		FIELD TOTAL	208,525	18,580	227,1

		Airfield Operations			
Aircraft	Operation Type	Day	Night	Total	
Category		0700-2200	2200-0700		
F-14 Fleet	Field Carrier Landing Practice	20,274	17,326	37,600	
F-14 FRS	Field Carrier Landing Practice	13,972	9,308	23,280	
F/A-18 Fleet	Field Carrier Landing Practice	13,570	8,650	22,220	
F/A-18 FRS	Field Carrier Landing Practice	17,695	6,497	24,192	
E-2 Fleet	Field Carrier Landing Practice	8,520	8,280	16,800	
E-2 FRS	Field Carrier Landing Practice	10,499	7,101	17,600	
C-2 Fleet	Field Carrier Landing Practice	7,704	644	8,348	
	AIRFI	ELD TOTAL 92,234	57,806	150,040	



Table A-4: Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-3

				irfield Operations	T-4-4
Aircraft	Operation Type		Day	Night	Tota!
Category			0700-2200	2200-0700	
F-14 Fleet	Departure	ł	12,176	1,105	13,281
	Full Stop Visual Landing		11,295	1,465	12,760
	Full Stop Instrument Landing		354	157	511
	Visual Touch-and-Go/Low Approach		20,402	994	21,396
	Instrument Touch-and-Go/Low Approach		472	56	528
	Field Carrier Landing Practice		176	80	256
		TOTAL	44,875	3,857	48,732
F-14 FRS	Departure	1	6,534	450	6,984
	Full Stop Visual Landing	İ	5,924	399	6,323
	Full Stop Instrument Landing	-	270	391	661
	Visual Touch-and-Go/Low Approach	1	25,502	904	26,406
	Instrument Touch-and-Go/Low Approach		3,698	1,612	5,310
	Field Carrier Landing Practice		o	0	0
		TOTAL	41,928	3,756	45,684
F/A-18 Fleet	Departure		10,222	827	11,049
	Full Stop Visual Landing		8,977	1,281	10,258
	Full Stop Instrument Landing		590	213	803
	Visual Touch-and-Go/Low Approach		17,786	1,512	19,298
	Instrument Touch-and-Go/Low Approach		1,590	528	2,118
	Field Carrier Landing Practice		220	660	880
	Ties Carter Landing Fractice	TOTAL	39.385	5.021	44,406
F/A-18 FRS	Departure	TOTAL	8,066	473	8,539
r/A-10 rns	Full Stop Visual Landing		6.900	674	7,574
	Full Stop Instrument Landing		621	344	965
	Visual Touch-and-Go/Low Approach		35,738	2,490	38,228
	Instrument Touch-and-Go/Low Approach		4,484	616	5,100
	Field Carrier Landing Practice		160	80	240
	Their Carrier Landing Fractice	TOTAL	55,969	4,677	60,646
Adversarv	Departure	TOTAL	2.272	56	2.328
Adversary .	Full Stop Visual Landing		2.316	0	2,326
	Full Stop Instrument Landing		11	1	2,310
	Visual Touch-and-Go/Low Approach		1,522	ò	1,522
	Instrument Touch-and-Go/Low Approach		164	o	1,322
	This differ today and Copies Approach	TOTAL	6,285	57	6,342
Transient Jet	Departure	TOTAL	946	21	967
Transient det	Full Stop Visual Landing		708	14	722
	Full Stop Instrument Landing		243	2	245
			1	1	
	Visual Touch-and-Go/Low Approach		1,042	22	1,064 822
	Instrument Touch-and-Go/Low Approach		792	30	
T		TOTAL	3,731	89	3,820
Transient Prop	Departure		1,639	30	1,669
	Full Stop Visual Landing	i	1,175	17	1,192
	Full Stop Instrument Landing		469	8	477
	Visual Touch-and-Go/Low Approach	İ	2,792	52	2,844
	Instrument Touch-and-Go/Low Approach		2,556	42	2,598
		TOTAL	8,631	149	8,780
	All	RFIELD TOTAL	200,804	17,606	218,410

			Airfield Operations		
Aircraft	Operation Type	Day	Night	Total	
Category		0700-2200	2200-0700		
F-14 Fleet	Field Carrier Landing Practice	21,508	16,972	38,480	
F-14 FRS	Field Carrier Landing Practice	14,575	9,425	24,000	
F/A-18 Fleet	Field Carrier Landing Practice	11,829	7,391	19,220	
F/A-18 FRS	Field Carrier Landing Practice	17,006	7,302	24,308	
E-2 Fleet	Field Carrier Landing Practice	8,641	8,159	16,800	
E-2 FRS	Field Carrier Landing Practice	10,514	7,086	17,600	
C-2 Fleet	Field Carrier Landing Practice	7,795	553	8,348	
	AIRFIELD TOTAL	91,868	56,888	148,756	



Table A-5: Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-4

				irfield Operations	<b>T</b> -4-1
Aircraft Category	Operation Type	T	<b>Day</b> 0700-2200	Night 2200-0700	Total
F-14 Fleet	Departure		12,155	1,123	13,278
r-14 Fieel	Full Stop Visual Landing		11,279	1,456	12,735
	Full Stop Instrument Landing		383	150	533
			19,656	996	20,652
	Visual Touch-and-Go/Low Approach		522	44	566
	Instrument Touch-and-Go/Low Approach		480	160	640
	Field Carrier Landing Practice	TOTAL	44,475	3,929	48,404
F-14 FRS	Departure		6,511	455	6,966
r-14 FMS	Full Stop Visual Landing		5,896	428	6,324
			260	382	642
	Full Stop Instrument Landing		25,420	964	26,384
	Visual Touch-and-Go/Low Approach		3,670	1,598	5,268
	Instrument Touch-and-Go/Low Approach		360	0	360
	Field Carrier Landing Practice	TOTAL	42,117	3,827	45,944
		TOTAL		719	9,004
F/A-18 Fleet	Departure		8,285	988	8,412
	Full Stop Visual Landing		7,424		604
	Full Stop Instrument Landing		453	151	
	Visual Touch-and-Go/Low Approach		14,538	876	15,414
	Instrument Touch-and-Go/Low Approach		1,314	316	1,630
	Field Carrier Landing Practice		380	600	980
		TOTAL	32,394	3,650	36,044
F/A-18 FRS	Departure		8,113	421	8,534
F/A-10 FN3	Full Stop Visual Landing		6,910	679	7,589
	Full Stop Instrument Landing	ì	666	279	945
	Visual Touch-and-Go/Low Approach		36,446	2,344	38,790
	Instrument Touch-and-Go/Low Approach		4,498	570	5,068
	1		240	80	320
	Field Carrier Landing Practice	TOTAL	56,873	4,373	61,246
		TOTAL	1,799	51	1,850
Adversary	Departure			0	1,837
	Full Stop Visual Landing		1,837		13
	Full Stop Instrument Landing		11	2	
	Visual Touch-and-Go/Low Approach		1,514	0	1,514
	Instrument Touch-and-Go/Low Approach		168	0	168
		TOTAL	5,329	53	5,382
Transient Jet	Departure		947	20	967
	Full Stop Visual Landing		708	14	722
	Full Stop Instrument Landing		243	2	245
	Visual Touch-and-Go/Low Approach		1,024	28	1,052
	Instrument Touch-and-Go/Low Approach		800	30	830
		TOTAL	3,722	94	3,816
Transient Prop	Departure		1,645	32	1,677
Tibiloicik Trop	Full Stop Visual Landing		1,186	16	1,202
	Full Stop Instrument Landing		467	8	475
	Visual Touch-and-Go/Low Approach		2,858	52	2,910
		1	2,566	42	2,608
	Instrument Touch-and-Go/Low Approach	TOTAL		150	8,872
		TOTAL AIRFIELD TOTAL	8,722 193,632	16,076	209,708
NALF Fentress		AINFIELD TOTAL		irfield Operations	200,700
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
F-14 Fleet	Field Carrier Landing Practice		21,027	17,053	38,080
F-14 FRS	Field Carrier Landing Practice		13,679	9,601	23,280
F/A-18 Fleet	Field Carrier Landing Practice		10,740	6,540	17,280
F/A-18 FRS	Field Carrier Landing Practice		17,848	6,424	24,272
E-2 Fleet	Field Carrier Landing Practice		8,472	8,328	16,800
	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		10,307	7,293	17,600
F-2 FRS	l Field Carrier Landino Practice	· ·	10,007	7,200	,000
E-2 FRS C-2 Fleet	Field Carrier Landing Practice Field Carrier Landing Practice		7,795	553	8,348



Table A-6: Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-5

				irfield Operations	=
Aircraft Category	Operation Type		<b>Day</b> 0700-2200	Night 2200-0700	Total
-14 Fleet	Departure		12,178	1,097	13,27
1411000	Full Stop Visual Landing		11,308	1,429	12,73
	Full Stop Instrument Landing		376	151	52
	Visual Touch-and-Go/Low Approach		19,794	1,010	20.80
	Instrument Touch-and-Go/Low Approach		488	60	54
	Field Carrier Landing Practice	+	576	160	73
	rield Carrier Landing Fractice	TOTAL	44,720	3,907	48.62
F-14 FRS	Departure	TOTAL	6,574	420	6.99
-14 FN3	Full Stop Visual Landing	1	5,938	404	6.34
	, ,		268	384	65
	Full Stop Instrument Landing			904	
	Visual Touch-and-Go/Low Approach		25,680		26,58
	Instrument Touch-and-Go/Low Approach		3,670	1,596	5,26
	Field Carrier Landing Practice		0	0	
		TOTAL	42,130	3,708	45,83
F/A-18 Fleet	Departure		8,224	729	8,95
	Full Stop Visual Landing		7,374	997	8,37
	Full Stop Instrument Landing		455	139	59
	Visual Touch-and-Go/Low Approach		14,170	936	15,10
	Instrument Touch-and-Go/Low Approach	1	1,288	356	1,64
	Field Carrier Landing Practice		220	480	70
		TOTAL	31,731	3,637	35,36
-/A-18 FRS	Departure		8,062	473	8,53
	Full Stop Visual Landing		6,918	700	7,6
	Full Stop Instrument Landing		623	294	9.
	Visual Touch-and-Go/Low Approach		36,272	2,330	38,60
	Instrument Touch-and-Go/Low Approach		4,476	640	5,1°
	Field Carrier Landing Practice		240	160	40
		TOTAL	56,591	4,597	61,18
Adversary	Departure		2,289	59	2,34
•	Full Stop Visual Landing	i	2.325	0	2.32
	Full Stop Instrument Landing		23	اه	-,
	Visual Touch-and-Go/Low Approach		1,496	o	1.49
	Instrument Touch-and-Go/Low Approach	i	164	ol	16
	modernia rodon and do asin, prodon	TOTAL	6,297	59	6,35
ransient Jet	Departure	TOTAL	947	20	96
	Full Stop Visual Landing		708	14	72
	Full Stop Instrument Landing		243	2	24
	Visual Touch-and-Go/Low Approach		1,006	22	1,02
	Instrument Touch-and-Go/Low Approach		804	30	83
	institutient i oddiratu-do/Low Approacti	TOTAL			
Transient Prop	Departure	TOTAL	3,708	88 31	3,79
ransient Frop	'		1,633	-	1,66
	Full Stop Visual Landing		1,177	16	1,19
	Full Stop Instrument Landing		463	8	4
	Visual Touch-and-Go/Low Approach		2,858	52	2,9
•	Instrument Touch-and-Go/Low Approach		2,582	42	2,62
	1	TOTAL	8,713	149	8,8

			Airfield Operations	
Aircraft	Operation Type	Day	Night	Total
Category		0700-2200	2200-0700	
F-14 Fleet	Field Carrier Landing Practice	21,345	16,655	38,000
F-14 FRS	Field Carrier Landing Practice	14,628	9,012	23,640
F/A-18 Fleet	Field Carrier Landing Practice	10,826	6,734	17,560
F/A-18 FRS	Field Carrier Landing Practice	17,356	6,836	24,192
E-2 Fleet	Field Carrier Landing Practice	8,558	8,242	16,800
E-2 FRS	Field Carrier Landing Practice	10,307	7,293	17,600
C-2 Fleet	Field Carrier Landing Practice	7,772	576	8,348
	AIRFIELD TO	TAL 90,792	55,348	146,140



Table A-7: Annual Basic Operations at MCAS Cherry Point for the Baseline Scenario

		<del></del>		Airfield Operations	Total
Aircraft	Operation Type		<b>Day</b> 0700-2200	Night 2200-0700	iotai
Category			9,996	127	10,123
AV-8 Fleet	Departure		8,062	307	8,369
	Full Stop Visual Landing		529	29	558
	Full Stop Instrument Landing		1,129	80	1,209
	Pad Landing		4,238	374	4,612
	Visual Touch-and-Go/Low Approach			24	2,370
	Instrument Touch-and-Go/Low Approach		2,346		6,686
	Press-Up		6,666	20	2,986
	Pad Vertical Take-off to Pad Landing Circuit		2,804	182	
		TOTAL	35,770	1,143	36,913
AV-8 FRS	Departure		11,404	166	11,570
	Full Stop Visual Landing		8,191	174	8,365 491
	Full Stop Instrument Landing		491	0	
	Pad Landing		2,651	63	2,714
	Visual Touch-and-Go/Low Approach		772	6	778
	Instrument Touch-and-Go/Low Approach		4,062	66	4,128
	Press-Up		6,476	70	6,546
	Pad Vertical Take-off to Pad Landing Circuit		2,518	122	2,640
		TOTAL	36,565	667	37,232
EA-6B	Departure		2,119	7	2,126
	Full Stop Visual Landing		1,753	136	1,889
	Full Stop Instrument Landing		220	18	238
	Visual Touch-and-Go/Low Approach		5,188	314	5,502
	Instrument Touch-and-Go/Low Approach		1,720	250	1,970
		TOTAL	11,000	725	11,725
KC-130 Fleet	Departure		632	0	632
	Full Stop Visual Landing		251	31	282
	Full Stop Instrument Landing		328	22	350
	Visual Touch-and-Go/Low Approach		1,358	126	1,484
	Instrument Touch-and-Go/Low Approach		1,582	24	1,606
		TOTAL	4,151	203	4,354
KC-130 FRS	Departure		803	0	803
	Full Stop Visual Landing		275	9	284
	Full Stop Instrument Landing		482	37	519
	Visual Touch-and-Go/Low Approach		3,772	170	3,942
	Instrument Touch-and-Go/Low Approach		3,296	60	3,356
	modellon rederidad de de la representada de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la rederidad de la	TOTAL	8,628	276	8,904
Transient Jet	Departure		1,750	48	1,798
Transient det	Full Stop Visual Landing		1,328	0	1,328
	Full Stop Instrument Landing		470	o	470
	Visual Touch-and-Go/Low Approach		1,336	o	1,336
	Instrument Touch-and-Go/Low Approach		1,050	2	1,052
	mstarier rodor and dozon reprodor	TOTAL	5,934	50	5,984
Transient Prop	Departure	TOTAL	658	0	658
Transierit Frop	Full Stop Visual Landing		219	o	219
	Full Stop Instrument Landing		439	o	439
	Visual Touch-and-Go/Low Approach		2,628	o	2,628
			360	2	362
	Instrument Touch-and-Go/Low Approach	TOTAL	4,304	2	4,306
T1	D	TOTAL	116	67	183
Transient Heavy	Departure		181	2	183
	Full Stop Instrument Landing		i i	ő	340
•	Instrument Touch-and-Go/Low Approach		340		
		TOTAL	637	69	706 694
Transient Large	Departure		535	159	
	Full Stop Visual Landing		146	0	146
	Full Stop Instrument Landing		541	7	548
	Instrument Touch-and-Go/Low Approach		938	6	944
		TOTAL	2,160	172	2,33
Transient Helicopter	Departure		1,360	405	1,76
	Full Stop Visual Landing		1,732	33	1,76
	Instrument Touch-and-Go/Low Approach		268	0	26
		TOTAL	3,360	438	3,79
		AIRFIELD TOTAL	112,509	3,745	116,254



Table A-8: Annual Basic Operations at MCAS Cherry Point for ARS-3

				irfield Operations	
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
AV-8 Fleet	Departure		9,801 7,923	158 304	9,95 8,22
	Full Stop Visual Landing			50	
	Full Stop Instrument Landing		514	!	56-
	Pad Landing		1,082	98	1,180
	Visual Touch-and-Go/Low Approach		3,846	374	4,220
	Instrument Touch-and-Go/Low Approach		2,314	12 10	2,326 6,656
	Press-Up Pad Vertical Take-off to Pad Landing Circuit		6,648 2,674	218	2.89
	Pad Vertical Laxe-off to Pad Canding Circuit	TOTAL	34.802	1,224	36,020
AV-8 FRS	Departure	TOTAL	11,139	140	11,279
AV-0 FN3	Full Stop Visual Landing		7,969	138	8,10
	, · · · · · · · · · · · · · · · · · · ·		517	6	52
	Full Stop Instrument Landing Pad Landing		2,597	. 52	2,64
	1		764	32	76
	Visual Touch-and-Go/Low Approach		3,972	44	4,016
	Instrument Touch-and-Go/Low Approach			62	6,414
	Press-Up		6,352		
	Pad Vertical Take-off to Pad Landing Circuit		2,438	94	2,53
-:		TOTAL	35,748	540	36,288
EA-6B	Departure		2,116	11	2,127
	Full Stop Visual Landing		1,736	154	1,890
	Full Stop Instrument Landing		222	16	238
	Visual Touch-and-Go/Low Approach		5,114	348	5,462
	Instrument Touch-and-Go/Low Approach		1,698	266	1,964
		TOTAL	10,886	795	11,681
F/A-18 Fleet	Departure	1	3,575	271	3,846
	Full Stop Visual Landing		3,068	346	3,414
	Full Stop Instrument Landing		348	80	428
	Visual Touch-and-Go/Low Approach		4,018	140	4,158
	Instrument Touch-and-Go/Low Approach		480	72	552
	Field Carrier Landing Practice		8,368	2,298	10,666
		TOTAL	19,857	3,207	23,064
KC-130 Fleet	Departure		631	0	631
	Full Stop Visual Landing		251	32	283
	Full Stop Instrument Landing		328	20	348
	Visual Touch-and-Go/Low Approach		1,354	138	1,492
	Instrument Touch-and-Go/Low Approach		1,572	40	1,612
		TOTAL	4,136	230	4,366
KC-130 FRS	Departure		802	0	802
	Full Stop Visual Landing		286	5	291
	Full Stop Instrument Landing		471	40	511
	Visual Touch-and-Go/Low Approach		3,834	90	3,924
	Instrument Touch-and-Go/Low Approach		3,234	60	3,294
		TOTAL	8,627	195	8,822
Transient Jet	Departure	1	1,756	40	1,796
	Full Stop Visual Landing	1	1,326	0	1,326
	Full Stop Instrument Landing	1	470	0	470
	Visual Touch-and-Go/Low Approach		1,304	0	1,304
	Instrument Touch-and-Go/Low Approach		1,030	2	1,032
Toronia de Da	2	TOTAL	5,886	42	5,928
Transient Prop	Departure		658	0	658
	Full Stop Visual Landing		219	0	219
	Full Stop Instrument Landing		439	0	439
	Visual Touch-and-Go/Low Approach		2,594	0	2,594
	Instrument Touch-and-Go/Low Approach		354	2	356
		TOTAL	4,264	2	4,266
Transient Heavy	Departure	T	110	73	183
	Full Stop Instrument Landing		181	2	183
	Instrument Touch-and-Go/Low Approach		328	0	328
Transient Large		TOTAL	619	75	694
	Departure		539	155	694
	Full Stop Visual Landing		146	0	146
	Full Stop Instrument Landing		540	8	548
	Instrument Touch-and-Go/Low Approach		914	6	920
		TOTAL	2,139	169	2,308
Transient Helicopter	Departure		1,348	417	1,765
	Full Stop Visual Landing	}	1,732	33	1,765
	Instrument Touch-and-Go/Low Approach		266	0	266
		TOTAL	3,346	450	3,796
		AIRFIELD TOTAL	130,310	6,929	137,239

Table A-9: Annual Basic Operations at MCAS Cherry Point for ARS-5

				irfield Operations	Total
Aircraft	Operation Type		Day	Night 2200-0700	iotai
Category			0700-2200	162	10,04
V-8 Fleet	Departure		9,882	326	8,317
	Full Stop Visual Landing		7,991	42	56
	Full Stop Instrument Landing		526	74	1,170
	Pad Landing		1,096		•
	Visual Touch-and-Go/Low Approach		3,986	328	4,314
	Instrument Touch-and-Go/Low Approach		2,328	18	2,346
	Press-Up		6,604	10	6,614
	Pad Vertical Take-off to Pad Landing Circuit		2,708	204	2,912
		TOTAL	35,121	1,164	36,285
AV-8 FRS	Departure		11,207	155	11,362
	Full Stop Visual Landing	İ	8,038	157	8,195
	Full Stop Instrument Landing		518	8	526
	Pad Landing		2,596	45	2,641
	Visual Touch-and-Go/Low Approach		732	12	744
			3,924	52	3,976
	Instrument Touch-and-Go/Low Approach		6,396	58	6,454
	Press-Up		2,438	96	2,534
	Pad Vertical Take-off to Pad Landing Circuit			583	36,432
		TOTAL	35,849		
EA-6B	Departure	ŀ	2,115	14	2,129
	Full Stop Visual Landing		1,729	151	1,880
	Full Stop Instrument Landing		224	24	248
	Visual Touch-and-Go/Low Approach		5,110	348	5,458
	Instrument Touch-and-Go/Low Approach		1,682	258	1,940
		TOTAL	10,860	795	11,655
F/A-18 Fleet	Departure		5,602	378	5,980
.,,	Full Stop Visual Landing		4,660	549	5,209
	Full Stop Instrument Landing	1	546	225	771
	Visual Touch-and-Go/Low Approach		7,148	468	7,616
	Instrument Touch-and-Go/Low Approach		712	160	872
	Field Carrier Landing Practice		9,686	2,554	12,240
	FIBIO Carrier Landing Fractice	TOTAL	28,354	4,334	32,688
		TOTAL	632	0	632
KC-130 Fleet	Departure		254	29	283
	Full Stop Visual Landing		i i	1	349
	Full Stop Instrument Landing		329	20	
	Visual Touch-and-Go/Low Approach		1,362	104	1,466
	Instrument Touch-and-Go/Low Approach		1,556	34	1,590
		TOTAL	4,133	187	4,320
KC-130 FRS	Departure		805	이	805
	Full Stop Visual Landing		283	6	289
	Full Stop Instrument Landing	1	474	42	516
	Visual Touch-and-Go/Low Approach		3,842	128	3,970
	Instrument Touch-and-Go/Low Approach	1	3,282	44	3,326
		TOTAL	8,686	220	8,906
Transient Jet	Departure		1,658	35	1,693
Transient out	Full Stop Visual Landing		1,221	o	1,221
	Full Stop Instrument Landing		472	o	472
	·		1,184	ol	1,184
	Visual Touch-and-Go/Low Approach		1,054	2	1,056
	Instrument Touch-and-Go/Low Approach	TOT:		37	5,626
		TOTAL	5,589		5,620
Transient Prop	Departure	ľ	661	0	
	Full Stop Visual Landing		219	0	219
	Full Stop Instrument Landing		442	0	442
	Visual Touch-and-Go/Low Approach	ļ	2,570	0	2,570
	Instrument Touch-and-Go/Low Approach		346	2	348
		TOTAL	4,238	2	4,240
Transient Heavy	Departure		118	65	183
,	Full Stop Instrument Landing		181	2	183
	Instrument Touch-and-Go/Low Approach	ļ	324	o	324
		TOTAL	623	67	690
Transient Large	Departure	101712	530	164	69-
	Full Stop Visual Landing		146	0	140
			540	8	54
	Full Stop Instrument Landing		910	6	916
	Instrument Touch-and-Go/Low Approach				
		TOTAL	2,126	178	2,30
Transient Helicopter	Departure	İ	1,367	398	1,76
	Full Stop Visual Landing		1,732	33	1,76
	Instrument Touch-and-Go/Low Approach		268	0	26
		TOTAL	3,367	431	3,79
		AIRFIELD TOTAL	138,946	7,998	146,94



Table A-10 Annual Basic Operations at MCALF Bogue Field for the Baseline Scenario

	·	Airfield Operatio		ns	
Aircraft Category	Operation Type	Day 0700-2200	Night 2200-0700	Total	
AV-8 Fleet	Field Carrier Landing Practice	3,240	0	3,240	
	Forward Base Operations	2,736	О	2,736	
	TOTAL	5,976	0	5,976	
AV-8 FRS	Field Carrier Landing Practice	3,960	0	3,960	
	Forward Base Operations	5,280	o	5,280	
	TOTAL	9,240	0	9,240	
EA-6B	Expeditionary Airfield Operations	36	0	36	
KC-130 Fleet	Normal Pattern Operations	20	0	20	
Marine Corps Helicopters	Arrivals/Departures/Pattern Operations	960	50	1,010	
Other Military Jet	Arrivals/Departures/Pattern Operations	790	135	925	
Other Military Helicopters	Arrivals/Departures/Pattern Operations	110	20	130	
	AIRFIELD TOTAL	17,132	205	17,337	



# A.2 Flight Track Airfield Operations

Flight track airfield operations are those commonly used to assess the frequency by which specific flight tracks are used and are provided to support noise assessment efforts. For NAS Oceana and NALF Fentress, they are defined as follows:

#### **NAS** Oceana

One aircraft leaving the airfield traffic pattern to the Southeasterly Departure

southeast (e.g., APOLLO Departure). One

operation.

One aircraft leaving the airfield traffic pattern to the Northeasterly Departure

northeast (e.g., SOUCEK/NORFOLK Departure).

One operation.

Interfacility Departure

to Fentress

One aircraft leaving the NAS Oceana airfield and arriving at NALF Fentress. One operation.

Straight-In/Full Stop

Arrival

One aircraft approaching the NAS Oceana directly

to a runway (including instrument and visual straight-in approaches) to either a full-stop landing, touch-and-go, or low approach (excluding arrivals

from NALF Fentress). One operation.

Overhead Arrival at

Oceana

One aircraft arriving at the airfield through the overhead approach (excluding arrivals from NALF

Fentress). One operation.

Visual Touch-and-Go

One full circuit of the visual (tower) pattern. Two

operations.

GCA Pattern

One full circuit of the GCA box pattern. Two

operations.

Depart and Reenter

to Overhead

One aircraft conducting an overhead approach immediately after leaving the airfield traffic pattern.

One operation.

**FCLP Pattern** 

One full circuit of the FCLP pattern at NAS Oceana.

Two operations.

Interfacility Arrival from

Fentress (w/ overhead

approach)

One aircraft leaving NALF Fentress and arriving at NAS Oceana via the overhead approach. One

operation.

Interfacility Arrival from

approach)

One aircraft leaving NALF Fentress and conducting

Fentress (w/ straight-in a straight-in approach at NAS Oceana. One

operation.



Interfacility Arrival from

Oceana(w/ overhead

One aircraft leaving NAS Oceana and arriving at NALF Fentress via the overhead approach.

approach)

One operation.

FCLP Pattern

One full circuit of the FCLP pattern at NALF

Fentress. Two operations.

Interfacility Departure

to Oceana

One aircraft leaving the NALF Fentress airfield and

arriving at NAS Oceana. One operation.

For MCAS Cherry Point and MCALF Bogue Field, the flight track descriptions are as follows:

# **MCAS Cherry Point**

Departure

One aircraft leaving the airfield traffic pattern. One

operation.

Interfacility Departure to

Bogue Field

One aircraft leaving the MCAS Cherry Point airfield

and arriving at MCALF Bogue Field. One

operation.

Straight-In/Full Stop

Arrival

One aircraft approaching MCAS Cherry Point

directly to a runway (including instrument and visual straight-in approaches) to either a full-stop landing, touch-and-go, or low approach (excluding arrivals

from MCALF Bogue Field). One operation.

Overhead Arrival at

Cherry Point to Runway

One aircraft arriving at the airfield through the overhead approach to a runway (excluding arrivals from MCALF Bogue Field). *One operation*.

Overhead Arrival at

Cherry Point to Pad

One AV-8 aircraft arriving at the airfield through the overhead approach to a pad (excluding arrivals from

MCALF Bogue Field). One operation.

Visual Touch-and-Go

One full circuit of the visual (tower) pattern. Two

operations.

**FCLP Pattern** 

One full circuit of the FCLP pattern at MCAS

Cherry Point. Two operations.

Full Circuit to Runway

One AV-8 aircraft entering the tower pattern for an arrival to a runway immediately after departing. Two

operations.

Full Circuit to Pad

One AV-8 aircraft entering the tower pattern for an

arrival to a pad immediately after departing. Two

operations.



GCA Pattern One full circuit of the GCA box pattern. Two

operations.

Depart and Reenter

to Overhead

One aircraft conducting an overhead approach immediately after leaving the airfield traffic pattern.

One operation.

Press-Up A vertical takeoff from a pad followed by hovering

maneuvers and a vertical pad landing. Two

operations.

Pad Vertical Takeoff to

Pad Landing Circuit

One aircraft performs a vertical takeoff from a pad, accelerates to forward flight speed around a pattern, and conducts an approach to a vertical pad landing.

Two operations.

Interfacility Arrival from Bogue Field (w/

overhead approach)

Interfacility Arrival from Bogue Field (w/

straight-in approach)

One aircraft leaving MCALF Bogue Field and arriving at MCAS Cherry Point via the overhead

approach. One operation.

One aircraft leaving MCALF Bogue Field and conducting a straight-in approach at MCAS Cherry

Point. One operation.

# **MCALF Bogue Field**

Interfacility Arrival from Cherry Point One aircraft leaving MCAS Cherry Point and arriving at MCALF Bogue Field. *One operation*.

Arrival

One aircraft arriving at MCALF Bogue Field

(excluding arrivals from MCAS Cherry Point). One

operation.

FCLP Pattern

One full circuit of the FCLP pattern at MCALF

Bogue Field. Two operations.

Forward Base Operations

Pattern

One full circuit of the FBO pattern at MCALF

Bogue Field. Two operations.

Interfacility Departure

to Cherry Point

One aircraft leaving MCALF Bogue Field and arriving at MCAS Cherry Point. *One operation*.



Table A-11: Annual Flight Track Operations at NAS Oceana for the Baseline Scenario

Category		ld Operations				
F-14 Fleet   Southeasterly Departure	Fotal .	Night	Day		Operation Type	Aircraft
Northeasterly Departure   4,729   91     Interfacility Departure to Fentress   1,750   665     Interfacility Arrival from Fentress (w/ overhead approach)   1,365   900     Interfacility Arrival from Fentress (w/ straight-in approach)   60   30     Straight-In/Full stop Arrival (non-interfacility)   450   25     Overhead Arrival at Oceana (non-interfacility)   9,938   386     Depart and Reenter to Overhead   111   0     Visual Touch-and-Go   19,377   1,130     GCA Box   304   44     FCLP Pattern   0   0   0     TOTAL   43,963   3,442     F-14 FRIS   Southeasterly Departure   1,661   0     Northeasterly Departure   3,976   0     Interfacility Arrival from Fentress (w/ overhead approach)   1,661   0     Northeasterly Arrival from Fentress (w/ overhead approach)   295   310     Interfacility Arrival from Fentress (w/ overhead approach)   295   310     Straight-In/Full stop Arrival (non-interfacility)   1,689   86     Overhead Arrival at Oceana (non-interfacility)   3,764   98     Overhead Arrival at Oceana (non-interfacility)   3,764   98     FCLP Pattern   0   0   0     Adversary   Southeasterly Departure   13,28     FCLP Pattern   0   0   0     Overhead Arrival at Oceana (non-interfacility)   742   2     Visual Touch-and-Go   2,216   1,328     FCLP Pattern   5   0   0     Overhead Arrival at Oceana (non-interfacility)   742   2     Visual Touch-and-Go   1,328   6     Overhead Arrival at Oceana (non-interfacility)   742   2     Visual Touch-and-Go   1,132   38     GCA Box   722   22     Transient Jet   Southeasterly Departure   46   2     Northeasterly Departure   5   1,52   38     Overhead Arrival at Oceana (non-interfacility)   742   2     Visual Touch-and-Go   1,132   38     GCA Box   722   22     Transient Prop   Southeasterly Departure   1,437   28     Straight-In/Full Stop Arrival (non-interfacility)   665   11     Visual Touch-and-Go   2,164   36						
Interfacility Arrival from Fentress (w/ overhead approach)	5,990				1	14 Fleet
Interfacility Arrival from Fentress (w/ overhead approach)	4,820	• •			Northeasterly Departure	
Interfacility Arrival from Fentress (w/ straight-in approach)	2,41	;	1,750		Interfacility Departure to Fentress	
Straight-In/Full stop Arrival (non-interfacility)	2,26	- 1	1,365		Interfacility Arrival from Fentress (w/ overhead approach	
Overhead Arrival at Oceana (non-interfacility)   9,938   386   Depart and Recenter to Overhead   111   0   Visual Touch-and-Go   19,377   1,130   GCA Box   304   44   FCLP Pattern   0   0   0   0   0   0   0   0   0	150	90	60		Interfacility Arrival from Fentress (w/ straight-in approact	
Depart and Reenter to Overhead   1111   0   Visual Touch-and-Go   19,377   1,130   GCA Box   70,40   44   44   70,40   70   70   70   70   70   70   70	475	25	450		Straight-In/Full stop Arrival (non-interfacility)	
Visual Touch-and-Go   19,377   1,130   GCA Box   304   44   FCLP Pattern   0   0   0   0   0   0   0   0   0	10,324	386	9,938		Overhead Arrival at Oceana (non-interfacility)	
GCA Box	111	0	111		Depart and Reenter to Overhead	
FCLP Pattern	20,507	1,130	19,377		Visual Touch-and-Go	
F-14 FRS  Southeasterly Departure  Northeasterly Departure  Interfacility Departure to Fentress  Interfacility Departure to Fentress  Interfacility Departure to Fentress (w/ overhead approach)  Interfacility Arrival from Fentress (w/ straight-in approach)  Straight-InvFull stop Arrival (non-interfacility)  Depart and Reenter to Overhead  Adversary  Adversary  Southeasterly Departure  Straight-InvFull stop Arrival (non-interfacility)  Adversary  Southeasterly Departure  Straight-InvFull stop Arrival (non-interfacility)  Overhead Arrival at Oceana (non-interfacility)  Straight-InvFull stop Arrival (non-interfacility)  Overhead Arrival at Oceana (non-interfacility)  Adversary  Southeasterly Departure  Straight-InvFull stop Arrival (non-interfacility)  Overhead Arrival at Oceana (non-interfacility)  Transient Jet  Southeasterly Departure  Northeasterly Departure	348	44	304		GCA Box	
F-14 FRS	(	0	0		FCLP Pattern	
Northeasterly Departure   3,976   0	47,40	3,442	43,963	TOTAL		
Interfacility Departure to Fentress 965 320 Interfacility Arrival from Fentress (w/ overhead approach) 520 160 Interfacility Arrival from Fentress (w/ straight-in approach) 520 160 Interfacility Arrival from Fentress (w/ straight-in approach) 295 310 Straight-In/Full stop Arrival (non-interfacility) 1,689 86 Overhead Arrival at Oceana (non-interfacility) 3,764 98 Depart and Reenter to Overhead 689 0 Visual Touch-and-Go 27,390 1,117 GCA Box 7,390 1,117 GCA Box 7,216 1,328 FCLP Pattern 0 0 O TOTAL 43,165 3,419 Adversary Southeasterly Departure 7,000 Straight-In/Full stop Arrival (non-interfacility) 89 0 Overhead Arrival at Oceana (non-interfacility) 7,42 2 Visual Touch-and-Go 7,000 TOTAL 2,261 15  Transient Jet Southeasterly Departure 901 18 Straight-In/Full stop Arrival (non-interfacility) 604 0 TOTAL 2,261 15  Transient Jet Southeasterly Departure 901 18 Straight-In/Full stop Arrival (non-interfacility) 670 8 Overhead Arrival at Oceana (non-interfacility) 670 8 Visual Touch-and-Go 7,000 TOTAL 3,764 94  Transient Prop Southeasterly Departure 1,437 28 Straight-In/Full stop Arrival (non-interfacility) 665 11 Overhead Arrival at Oceana (non-interfacility) 665 11 Overhead Arrival at Oceana (non-interfacility) 956 10 Visual Touch-and-Go 3,239 61 GCA Box 2,164 36	1,66	0	1,661		Southeasterly Departure	F-14 FRS
Interfacility Arrival from Fentress (w/ overhead approach) Interfacility Arrival from Fentress (w/ straight-in approach) Straight-In/Full istop Arrival (non-interfacility) Interfacility Arrival from Fentress (w/ straight-in approach) Straight-In/Full istop Arrival (non-interfacility) Interfacility Arrival into Deana (non-interfacility) Interfacility Arrival at Oceana (non-interfacility) Interfacility Arrival at Oceana (non-interfacility) Interfacility Arrival at Oceana (non-interfacility) Interfacility Arrival at Oceana (non-interfacility) Interfacility Arrival Arrival at Oceana (non-interfacility) Interfacility Arrival Arrival at Oceana (non-interfacility) Interfacility Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arrival Arriva	3,976	0	3,976		Northeasterly Departure	
Interfacility Arrival from Fentress (w/ straight-in approach)   295   310     Straight-In/Full stop Arrival (non-interfacility)   1,689   86     Overhead Arrival at Oceana (non-interfacility)   3,764   98     Depart and Reenter to Overhead   689   0     Visual Touch-and-Go   27,390   1,117     GCA Box   2,216   1,328     FCLP Pattern   0   0     Adversary   Southeasterly Departure   673   13     Northeasterly Departure   153   0     Straight-In/Full stop Arrival (non-interfacility)   89   0     Overhead Arrival at Oceana (non-interfacility)   742   2     Visual Touch-and-Go   TOTAL   2,261   15     Transient Jet   Southeasterly Departure   46   2     Northeasterly Departure   901   18     Straight-In/Full stop Arrival (non-interfacility)   283   6     Overhead Arrival at Oceana (non-interfacility)   670   8     Visual Touch-and-Go   1,132   38     GCA Box   722   22     Total Total Total Southeasterly Departure   1,143   38     GCA Box   TOTAL Southeasterly Departure   1,437   28     Straight-In/Full stop Arrival (non-interfacility)   665   11     Overhead Arrival at Oceana (non-interfacility)   956   10     Visual Touch-and-Go   3,239   61     GCA Box   2,164   36	1,28	320	965		Interfacility Departure to Fentress	
Interfacility Arrival from Fentress (w/ straight-in approach)   295   310	680	160	520		Interfacility Arrival from Fentress (w/ overhead approach	
Overhead Arrival at Oceana (non-interfacility)   3,764   98   Depart and Reenter to Overhead   689   0   0   0   0   0   0   0   0   0	608	310	295	1		
Overhead Arrival at Oceana (non-interfacility)   3,764   98   Depart and Reenter to Overhead   689   0   0   0   0   0   0   0   0   0	1,775	86	1,689		Straight-In/Full stop Arrival (non-interfacility)	
Depart and Reenter to Overhead   689   0	3,862	98	3,764			
Visual Touch-and-Go	689	o	689		1	
GCA Box   FCLP Pattern   Co	28,507	1,117				
FCLP Pattern	3,54	· 1	· ·			
TOTAL   43,165   3,419   Adversary   Southeasterly Departure   673   13   Northeasterly Departure   153   0   Straight-In/Full stop Arrival (non-interfacility)   89   0   Overhead Arrival at Oceana (non-interfacility)   742   2   2   Visual Touch-and-Go   604   0   O   TOTAL   2,261   15   Transient Jet   Southeasterly Departure   901   18   Straight-In/Full stop Arrival (non-interfacility)   283   6   Overhead Arrival at Oceana (non-interfacility)   670   8   Visual Touch-and-Go   1,132   38   GCA Box   722   22   TOTAL   3,754   94   Transient Prop   Southeasterly Departure   1,437   28   Straight-In/Full stop Arrival (non-interfacility)   665   11   Overhead Arrival at Oceana (non-interfacility)   665   11   Overhead Arrival at Oceana (non-interfacility)   956   10   Visual Touch-and-Go   3,239   61   GCA Box   2,164   36	0,0 .					
Southeasterly Departure   153   0	46.584	- · · · · · · · · · · · · · · · · · · ·		TOTAL	102 ( 4.6.11	
Northeasterly Departure   153   0   Straight-In/Full stop Arrival (non-interfacility)   89   0   0   0   0   0   0   0   0   0	686			101/12	Southeasterly Departure	Artversarv
Straight-In/Full stop Arrival (non-interfacility)   89   0	153	1	1	1	* '	, avoidal y
Overhead Arrival at Oceana (non-interfacility)   742   2   Visual Touch-and-Go   604   0   0	89	- 1	1		•	
Visual Touch-and-Go	744	1			, , ,	
TOTAL   2,261   15	604		1		•	
Transient Jet         Southeasterly Departure         46         2           Northeasterly Departure         901         18           Straight-In/Full stop Arrival (non-interfacility)         283         6           Overhead Arrival at Oceana (non-interfacility)         670         8           Visual Touch-and-Go         1,132         38           GCA Box         722         22           Total         3,754         94           Transient Prop         Southeasterly Departure         174         3           Northeasterly Departure         1,437         28           Straight-In/Full stop Arrival (non-interfacility)         665         11           Overhead Arrival at Oceana (non-interfacility)         956         10           Visual Touch-and-Go         3,239         61           GCA Box         2,164         36	2,276			TOTAL	Visual Todor and Go	
Northeasterly Departure   901   18	48			TOTAL	Southeasterly Departure	Transient let
Straight-In/Full stop Arrival (non-interfacility)   283   6     Overhead Arrival at Oceana (non-interfacility)   670   8     Visual Touch-and-Go   1,132   38     GCA Box   722   22     TOTAL   3,754   94     Transient Prop   Southeasterly Departure   174   3     Northeasterly Departure   1,437   28     Straight-In/Full stop Arrival (non-interfacility)   665   11     Overhead Arrival at Oceana (non-interfacility)   956   10     Visual Touch-and-Go   3,239   61     GCA Box   2,164   36	919		1		, ,	THE BIOTH CO.
Overhead Arrival at Oceana (non-interfacility) 670 8 Visual Touch-and-Go 1,132 38 GCA Box 722 22  TOTAL 3,754 94  Transient Prop Southeasterly Departure 174 3 Northeasterly Departure 1,437 28 Straight-In/Full stop Arrival (non-interfacility) 665 11 Overhead Arrival at Oceana (non-interfacility) 956 10 Visual Touch-and-Go 3,239 61 GCA Box 2,164 36	289	I			1 ' '	
Visual Touch-and-Go     1,132     38       GCA Box     722     22       TOTAL     3,754     94       Transient Prop     Southeasterly Departure     174     3       Northeasterly Departure     1,437     28       Straight-In/Full stop Arrival (non-interfacility)     665     11       Overhead Arrival at Oceana (non-interfacility)     956     10       Visual Touch-and-Go     3,239     61       GCA Box     2,164     36	678	I			1 - ' ' ' '	
GCA Box 722 22  TOTAL 3,754 94  Transient Prop Southeasterly Departure 174 3  Northeasterly Departure 1,437 28  Straight-In/Full stop Arrival (non-interfacility) 665 11  Overhead Arrival at Oceana (non-interfacility) 956 10  Visual Touch-and-Go 3,239 61  GCA Box 2,164 36	1,170	I	· i			
TOTAL   3,754   94	744		· 1			
Transient Prop         Southeasterly Departure         174         3           Northeasterly Departure         1,437         28           Straight-In/Full stop Arrival (non-interfacility)         665         11           Overhead Arrival at Oceana (non-interfacility)         956         10           Visual Touch-and-Go         3,239         61           GCA Box         2,164         36	3,848			TOTAL	00/150/	
Northeasterly Departure       1,437       28         Straight-In/Full stop Arrival (non-interfacility)       665       11         Overhead Arrival at Oceana (non-interfacility)       956       10         Visual Touch-and-Go       3,239       61         GCA Box       2,164       36	177			10174	Southeasterly Departure	Transient Prop
Straight-In/Full stop Arrival (non-interfacility)       665       11         Overhead Arrival at Oceana (non-interfacility)       956       10         Visual Touch-and-Go       3,239       61         GCA Box       2,164       36	1,465	l l			4 · · · · · · · · · · · · · · · · · · ·	
Overhead Arrival at Oceana (non-interfacility) 956 10 Visual Touch-and-Go 3,239 61 GCA Box 2,164 36	676	l l	' !		1 ,	
Visual Touch-and-Go         3,239         61           GCA Box         2,164         36	966	<b>I</b>			. , ,	
GCA Box 2,164 36	3,300				, , , , , , , , , , , , , , , , , , , ,	
	2,200		· ·			
				TOTAL	don bux	
AIRFIELD TOTAL 101,778 7,119	8,784 108,897					



Table A-12: Annual Flight Track Operations at NAS Oceana for ARS-1

				irfield Operations	
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200 4,798	2200-0700	4,85
-14 Fleet	Southeasterly Departure		5,953	99	6.05
	Northeasterly Departure		1,390	995	2.3
	Interfacility Departure to Fentress			1,045	2,17
	Interfacility Arrival from Fentress (w/ overhead approach)		1,130	140	2,1
	Interfacility Arrival from Fentress (w/ straight-in approach)		70	- 1	
	Straight-In/Full stop Arrival (non-interfacility)		464	41	50
	Overhead Arrival at Oceana (non-interfacility)		10,015	380	10,39
	Depart and Reenter to Overhead		108	o	10
	Visual Touch-and-Go		20,908	1,076	21,98
	GCA Box		240	56	29
	FCLP Pattern		640	240	88
		TOTAL	45,716	4,132	49,84
F-14 FRS	Southeasterly Departure		1,593	0	1,59
	Northeasterly Departure		4,041	0	4,04
	Interfacility Departure to Fentress		880	415	1,29
	Interfacility Arrival from Fentress (w/ overhead approach)		485	190	61
	Interfacility Arrival from Fentress (w/ straight-in approach)	1	290	330	62
	Straight-In/Full stop Arrival (non-interfacility)		1,674	132	1,80
	Overhead Arrival at Oceana (non-interfacility)	1	3,740	88	3,82
	Depart and Reenter to Overhead		692	o	69
	Visual Touch-and-Go		26,158	1,100	27,25
	GCA Box		2,178	1,366	3.54
	FCLP Pattern		2,0	180	18
	FOLF Fallett	TOTAL	41,731	3.801	45.53
E14 40 E1	Coult contain Departure	TOTAL	6,211	232	6.44
F/A-18 Fleet	Southeasterly Departure	1	6,729	96	6,82
	Northeasterly Departure		1,305	880	2,18
	Interfacility Departure to Fentress			933	1,99
	Interfacility Arrival from Fentress (w/ overhead approach)		1,065		
	Interfacility Arrival from Fentress (w/ straight-in approach)		80	107	18
	Straight-In/Full stop Arrival (non-interfacility)		1,693	617	2,3
	Overhead Arrival at Oceana (non-interfacility)		10,546	424	10,97
	Depart and Reenter to Overhead		326	0	32
	Visual Touch-and-Go		25,840	2,884	28,72
	GCA Box		408	72	48
	FCLP Pattern		1,180	1,080	2,26
		TOTAL	55,383	7,325	62,70
F/A-18 FRS	Southeasterly Departure		385	0	38
	Northeasterly Departure		6,542	84	6,62
	Interfacility Departure to Fentress		1,122	395	1,51
	Interfacility Arrival from Fentress (w/ overhead approach)		672	193	86
	Interfacility Arrival from Fentress (w/ straight-in approach)		345	307	65
	Straight-In/Full stop Arrival (non-interfacility)		1,977	280	2,25
	Overhead Arrival at Oceana (non-interfacility)	- 1	4,560	194	4,75
•		- 1	1,165	181	1,34
	Depart and Reenter to Overhead			2,704	40,2
	Visual Touch-and-Go	i	37,548		1,7
	GCA Box	ĺ	1,498	218	-
	FCLP Pattern		160	0	10
		TOTAL	55,974	4,556	60,5
Adversary	Southeasterly Departure		1,715	71	1,78
	Northeasterly Departure		547	0	54
	Straight-In/Full stop Arrival (non-interfacility)	- 1	116	1	1
	Overhead Arrival at Oceana (non-interfacility)	l	2,216	0	2,2
	Visual Touch-and-Go		1,642	0	1,6
		TOTAL	6,236	72	6,3
Transient Jet	Southeasterly Departure		46	2	
	Northeasterly Departure	1	901	18	9
	Straight-In/Full stop Arrival (non-interfacility)	- 1	285	8	2
	Overhead Arrival at Oceana (non-interfacility)	İ	668	6	6
	Visual Touch-and-Go	- 1	1,084	32	1,1
	IGCA Box		722	22	7-
		TOTAL	3,706	88	3,7
Transient Prop	Southeasterly Departure		174	3	1
	Northeasterly Departure		1,460	27	1,4
	Straight-In/Full stop Arrival (non-interfacility)	1	670	12	6
		ĺ			9
	Overhead Arrival at Oceana (non-interfacility)		973	9	9
		ı	ا ـــــ ۸	أمم	
	Visual Touch-and-Go	_	3,171	61	3,2
		TOTAL	3,171 2,176 8,624	61 36 148	3,2 2,2 8,7



Table A-13: Annual Flight Track Operations at NAS Oceana for ARS-2

				Airfield Operations	
Aircraft Category	Operation Type		Day 0700-2200	Night 2200-0700	Total
F-14 Fleet	Southeasterly Departure		4,912	67	4,97
	Northeasterly Departure	1	5,739	102	5,84
	Interfacility Departure to Fentress	- [	1,375	975	2,35
	Interfacility Arrival from Fentress (w/ overhead approach)		1,140	1,025	2,16
	Interfacility Arrival from Fentress (w/ straight-in approach)		45	140	18
	Straight-In/Full stop Arrival (non-interfacility)		472	51	52
	Overhead Arrival at Oceana (non-interfacility)	1	9,943	344	10,28
	Depart and Reenter to Overhead		105	o	10
	Visual Touch-and-Go		20,748	1,027	21,77
	GCA Box		264	64	32
	FCLP Pattern		976	320	1,29
		TOTAL	45,719	4,115	49,83
F-14 FRS	Southeasterly Departure	-	1,623	0	1,62
	Northeasterly Departure	-	4,012	oj	4,01
	Interfacility Departure to Fentress		830	455	1,28
	Interfacility Arrival from Fentress (w/ overhead approach)	ĺ	450	220	67
	Interfacility Arrival from Fentress (w/ straight-in approach)		280	335	61
	Straight-In/Full stop Arrival (non-interfacility)		1,702	93	1,79
	Overhead Arrival at Oceana (non-interfacility)		3,752	88	3,84
	Depart and Reenter to Overhead		690	0	69
	Visual Touch-and-Go		26,363	1,063	27,42
	GCA Box	i	2,122	1,412	3,53
	FCLP Pattern		50	130	180
		TOTAL	41,874	3,796	45,670
F/A-18 Fleet	Southeasterly Departure		5,427	212	5,639
	Northeasterly Departure		5,616	80	5,696
	Interfacility Departure to Fentress		995	<b>65</b> 5	1,650
	Interfacility Arrival from Fentress (w/ overhead approach)		830	641	1,471
	Interfacility Arrival from Fentress (w/ straight-in approach)		55	124	179
	Straight-In/Full stop Arrival (non-interfacility)	ŀ	1,453	525	1,978
	Overhead Arrival at Oceana (non-interfacility)	ŀ	8,990	380	9,370
•	Depart and Reenter to Overhead		275	0	275
	Visual Touch-and-Go		22,223	2,592	24,815
	GCA Box		326	26	352
	FCLP Pattern		140	924	1,064
F/A-18 FRS	6.4	TOTAL	46,330	6,159	52,489
F/A-10 FN3	Southeasterly Departure	l	406	0	406
	Northeasterly Departure		6,522	101	6,623
	Interfacility Departure to Fentress		1,189	310	1,499
	Interfacility Arrival from Fentress (w/ overhead approach)	1	664	190	854
	Interfacility Arrival from Fentress (w/ straight-in approach)		365	280	645
	Straight-In/Full stop Arrival (non-interfacility)		1,927	269	2,196
	Overhead Arrival at Oceana (non-interfacility)  Depart and Reenter to Overhead	ŀ	4,655	178	4,833
	Visual Touch-and-Go	İ	1,179	165	1,344
	GCA Box		37,685	2,483	40,168
	FCLP Pattern	1	1,560	160	1,720
	1 OLF Falletti	TOTAL	320	80	400
Adversary	Southeasterly Departure	TOTAL	56,472	4,216	60,688
	Northeasterly Departure		1,433	55	1,488
	Straight-In/Full stop Arrival (non-interfacility)		529	0	529
	Overhead Arrival at Oceana (non-interfacility)		94 1,922	1 0	95
	Visual Touch-and-Go		1,698	o	1,922
		TOTAL	5,676	56	1,698
Transient Jet	Southeasterly Departure	-10176	46	2	5,732 48
	Northeasterly Departure		900	19	919
	Straight-In/Full stop Arrival (non-interfacility)		285	8	293
	Overhead Arrival at Oceana (non-interfacility)	ļ	668	6	674
	Visual Touch-and-Go	1	1,102	32	1,134
	GCA Box		720	22	742
		TOTAL	3,721	89	3,810
Transient Prop	Southeasterly Departure		174	3	177
	Northeasterly Departure	1	1,464	28	1,492
	Straight-In/Full stop Arrival (non-interfacility)		669	12	681
	Overhead Arrival at Oceana (non-interfacility)	ŀ	979	9	988
	Visual Touch-and-Go	1	3,281	61	3,342
	GCA Box	1	2,166	36	2,202
		TOTAL	8,733	149	8,882

Table A-14: Annual Flight Track Operations at NAS Oceana for ARS-3

				Airfield Operations	Total
Aircraft	Operation Type		Day 0700-2200	Night 2200-0700	i otai
Category	0 11 12 12 12 12 12 12 12 12 12 12 12 12		5.000	79	5.07
-14 Fleet	Southeasterly Departure		5,695	86	5,7
	Northeasterly Departure		1,470	935	2.4
	Interfacility Departure to Fentress		1,205	1,027	2,2
	Interfacility Arrival from Fentress (w/ overhead approach)			128	1
	Interfacility Arrival from Fentress (w/ straight-in approach)		45	41	4
	Straight-In/Full stop Arrival (non-interfacility)		440	1	
	Overhead Arrival at Oceana (non-interfacility)		9,979	390	10,3
	Depart and Reenter to Overhead		110	0	1
	Visual Touch-and-Go		20,503	1,035	21,5
	GCA Box		252	56	31
	FCLP Pattern		176	80	25
		TOTAL	44,875	3,857	48,73
F-14 FRS	Southeasterly Departure		1,621	0	1,62
1-147110	Northeasterly Departure		4,013	o	4,0
•	Interfacility Departure to Fentress		875	450	1,33
	Interfacility Arrival from Fentress (w/ overhead approach)		475	220	69
			280	350	6
	Interfacility Arrival from Fentress (w/ straight-in approach)		1,682	104	1,70
	Straight-In/Full stop Arrival (non-interfacility)		3,768	80	3,84
	Overhead Arrival at Oceana (non-interfacility)			0	69
	Depart and Reenter to Overhead		690	-	
	Visual Touch-and-Go		26,388	1,066	27,4
	GCA Box		2,136	1,486	3,62
	FCLP Pattern		0	0	
		TOTAL	41,928	3,756	45,68
F/A-18 Fleet	Southeasterly Departure		4,490	146	4,63
	Northeasterly Departure	ĺ	4,854	59	4,9
	Interfacility Departure to Fentress	İ	865	565	1,43
	Interfacility Arrival from Fentress (w/ overhead approach)	1	745	591	1,33
	Interfacility Arrival from Fentress (w/ straight-in approach)	1	35	59	9
	Straight-In/Full stop Arrival (non-interfacility)	1	1,222	400	1,62
	Overhead Arrival at Oceana (non-interfacility)	ł	7,607	332	7,93
	· · · · · · · · · · · · · · · · · · ·	]	231	0	23
	Depart and Reenter to Overhead	1	18,854	2,167	21,02
	Visual Touch-and-Go		264	40	30
	GCA Box	•		660	88
	FCLP Pattern		220		
		TOTAL	39,387	5,019	44,40
F/A-18 FRS	Southeasterly Departure		360	0	
	Northeasterly Departure		6,570	88	6,6
	Interfacility Departure to Fentress	i	1,126	380	1,5
	Interfacility Arrival from Fentress (w/ overhead approach)	- 1	691	195	88
	Interfacility Arrival from Fentress (w/ straight-in approach)	- 1	305	315	62
	Straight-In/Full stop Arrival (non-interfacility)	1	1,958	269	2,2
	Overhead Arrival at Oceana (non-interfacility)	i	4,589	202	4,79
	Depart and Reenter to Overhead	1	1,170	182	1,3
	Visual Touch-and-Go	- 1	37,490	2,796	40,2
	GCA Box	1	1,550	170	1,7
	FCLP Pattern	1	160	80	2
	TOE TENOM	TOTAL	55.969	4,677	60.6
Adversary	Southeasterly Departure	101712	1,773	56	1,8
Adversary	1	l	499	ő	4:
	Northeasterly Departure		499 95	1	
	Straight-In/Full stop Arrival (non-interfacility)			1	
	Overhead Arrival at Oceana (non-interfacility)		2,232	0	2,2
	Visual Touch-and-Go		1,686	0	1,6
		TOTAL	6,285	57	6,3
Transient Jet	Southeasterly Departure	1	46	2	_
	Northeasterly Departure	1	900	19	9
	Straight-In/Full stop Arrival (non-interfacility)	- 1	284	9	2
	Overhead Arrival at Oceana (non-interfacility)		669	5	6
	Visual Touch-and-Go		1,120	32	1,1
	GCA Box	į	712	22	7
		TOTAL	3,731	89	3,8
Transient Prop	Southeasterly Departure		170	3	1
	Northeasterly Departure		1,469	27	1,4
				12	·,•
	Straight-In/Full stop Arrival (non-interfacility)		665		
	Overhead Arrival at Oceana (non-interfacility)		983	9	9
	Visual Touch-and-Go	1	3,180	62	3,2
	GCA Box		2,164	36	2,2
		TOTAL	8,631	149	8,7
		DTOTAL	200,806	17,604	218,4



Table A-15: Annual Flight Track Operations at NAS Oceana for ARS-4

	C		Day	irfield Operations Night	Total
Aircraft	Operation Type		0700-2200	2200-0700	IULAI
Category -14 Fieet	Courth control of Departure		5,111	67	5.17
- 14 Fieel	Southeasterly Departure	- 1	5,579	101	5,68
	Northeasterly Departure		1,435	945	2,38
	Interfacility Departure to Fentress		1,170	1,030	2,20
	Interfacility Arrival from Fentress (w/ overhead approach)				11
	Interfacility Arrival from Fentress (w/ straight-in approach)		55	125	
	Straight-In/Full stop Arrival (non-interfacility)	j	486	31	5
	Overhead Arrival at Oceana (non-interfacility)		9,965	366	10,33
	Depart and Reenter to Overhead	1	117	0	11
	Visual Touch-and-Go		19,789	1,060	20,84
	GCA Box		288	44	33
	FCLP Pattern		480	160	6
		TOTAL	44,475	3,929	48,40
-14 FRS	Southeasterly Departure		1,612	0	1,6
-141110	Northeasterly Departure	1	4,024	o	4,0
	Interfacility Departure to Fentress		830	455	1,2
			440	240	6
	Interfacility Arrival from Fentress (w/ overhead approach)	ŀ	260	345	6
	Interfacility Arrival from Fentress (w/ straight-in approach)		l.	108	1.8
	Straight-In/Full stop Arrival (non-interfacility)	i	. 1,699	- 1	
	Overhead Arrival at Oceana (non-interfacility)	ĺ	3,755	74	3,8
	Depart and Reenter to Overhead	1	688	٥¦	6
	Visual Touch-and-Go		26,335	1,137	27,4
	GCA Box		2,114	1,468	3,5
	FCLP Pattern	1	360	0	3
		TOTAL	42,117	3,827	45,94
F/A-18 Fleet	Southeasterly Departure		3,825	111	3,90
1/A-10 1 lbox	Northeasterly Departure		3,650	53	3.70
	Interfacility Departure to Fentress		785	505	1,2
	1		695	535	1,2
	Interfacility Arrival from Fentress (w/ overhead approach)	Į.	25	35	,,_,
	Interfacility Arrival from Fentress (w/ straight-in approach)		ľ	268	1,2
	Straight-In/Full stop Arrival (non-interfacility)		1,021		
	Overhead Arrival at Oceana (non-interfacility)		6,151	211	6,3
	Depart and Reenter to Overhead		183	0	18
	Visual Touch-and-Go		15,471	1,316	16,78
	GCA Box		208	16	23
	FCLP Pattern		380	600	91
		TOTAL	32,394	3,650	36,04
F/A-18 FRS	Southeasterly Departure		412	0	4
	Northeasterly Departure		6,507	91	6,5
	Interfacility Departure to Fentress		1,179	325	1,5
	Interfacility Arrival from Fentress (w/ overhead approach)	- 1	714	205	9
	Interfacility Arrival from Fentress (w/ straight-in approach)	1	335	250	5
	Straight-In/Full stop Arrival (non-interfacility)	ŀ	1,984	248	2,2
	Overhead Arrival at Oceana (non-interfacility)		4,580	198	4,7
		- 1	1,176	162	1,3
	Depart and Reenter to Overhead	1		2,644	40.8
	Visual Touch-and-Go	Į	38,200		
	GCA Box	I	1,546	170	1,7
	FCLP Pattern		240	80	3
****		TOTAL	56,873	4,373	61,2
Adversary	Southeasterly Departure	1	1,305	51	1,3
	Northeasterly Departure	1	494	0	4
	Straight-In/Full stop Arrival (non-interfacility)		98]	2	1
	Overhead Arrival at Oceana (non-interfacility)	Ì	1,750	0	1,7
	Visual Touch-and-Go		1,682	0	1,6
		TOTAL	5,329	53	5,3
Transient Jet	Southeasterly Departure		46	2	
	Northeasterly Departure	l	901	18	9
	Straight-In/Full stop Arrival (non-interfacility)	, [	286	7	2
	Overhead Arrival at Oceana (non-interfacility)	ļ	667	7	ε
	Visual Touch-and-Go	ŀ	1,102	38	1,1
	GCA Box		720	22	7
		TOTAL	3,722	94	3,8
Tennsiont Bree	Courthogotody Doporture	IOIAL	174	3	3,0
Transient Prop	Southeasterly Departure	l			
	Northeasterly Departure	1	1,471	29	1,5
	Straight-In/Full stop Arrival (non-interfacility)		667	12	(
	Overhead Arrival at Oceana (non-interfacility)		989	9	
	Visual Touch-and-Go		3,251	61	3,3
	GCA Box	-	2,170	36	2,3
		TOTAL	8,722	150	8,0
	1		U, 122	100	0,0



Table A-16: Annual Flight Track Operations at NAS Oceana for ARS-5

			Airfield Operations		Total
Aircraft	Operation Type	- 1	Day	Night	Total
Category			0700-2200	2200-0700	5,20
-14 Fleet	Southeasterly Departure		5,133 5.559	89	5,64
	Northeasterly Departure			925	2,3
	Interfacility Departure to Fentress	1	1,450	1,010	2,2
	Interfacility Arrival from Fentress (w/ overhead approach)		1,190		1
	Interfacility Arrival from Fentress (w/ straight-in approach)		55	120	5
	Straight-In/Full stop Arrival (non-interfacility)		474	35	_
	Overhead Arrival at Oceana (non-interfacility)		9,960	374	10,3
	Depart and Reenter to Overhead		106	0	11
	Visual Touch-and-Go	1	19,941	1,061	21,0
	GCA Box		276	60	3
	FCLP Pattern		576	160	. 7
	100110000	TOTAL	44,720	3,907	48,6
-14 FRS	Southeasterly Departure		1,645	. 0	1,6
14 FHS	1 .		4,019	o	4,0
	Northeasterly Departure		885	420	1,3
	Interfacility Departure to Fentress	1	475	210	
	Interfacility Arrival from Fentress (w/ overhead approach)	1	275	345	6
	Interfacility Arrival from Fentress (w/ straight-in approach)			103	1,7
	Straight-In/Full stop Arrival (non-interfacility)		1,691	1	3,8
	Overhead Arrival at Oceana (non-interfacility)	-	3,776	94	-
	Depart and Reenter to Overhead		692	0	
	Visual Touch-and-Go	1	26,564	1,068	27,6
	GCA Box		2,108	1,468	3,5
	FCLP Pattern		0	0	
		TOTAL	42,130	3,708	45,8
F/A-18 Fieet	Southeasterly Departure		3,634	128	3,7
r/A-10 Flock	Northeasterly Departure		3,775	51	3,8
	Interfacility Departure to Fentress	1	800	510	1,3
	Interfacility Arrival from Fentress (w/ overhead approach)	i	694	550	1,2
			21	45	
	Interfacility Arrival from Fentress (w/ straight-in approach)		1,006	264	1,2
	Straight-In/Full stop Arrival (non-interfacility)	1	6,132	198	6,3
	Overhead Arrival at Oceana (non-interfacility)	1			1
	Depart and Reenter to Overhead		183	1,387	16.4
	Visual Touch-and-Go		15,082		•
	GCA Box		184	24	2
	FCLP Pattern		220	480	7
		TOTAL	31,731	3,637	35,3
F/A-18 FRS	Southeasterly Departure		403	5	4
	Northeasterly Departure		6,490	113	6,6
	Interfacility Departure to Fentress		1,154	345	1,4
	Interfacility Arrival from Fentress (w/ overhead approach)		709	225	٤
	Interfacility Arrival from Fentress (w/ straight-in approach)	1	305	260	5
	Straight-In/Full stop Arrival (non-interfacility)		1,961	268	2,2
	Overhead Arrival at Oceana (non-interfacility)	- 1	4,579	203	4,7
	Depart and Reenter to Overhead	- 1	1,184	172	1,3
	Visual Touch-and-Go	- 1	38,066	2,626	40,6
	IGCA Box		1,500	220	1,7
	1	Ì	240	160	4
	FCLP Pattern	TOTAL	56,591	4,597	61,1
		TOTAL		59	1,8
Adversary	Southeasterly Departure		1,790	0	1,0
	Northeasterly Departure	i	499		
	Straight-In/Full stop Arrival (non-interfacility)		109	0	_ 1
	Overhead Arrival at Oceana (non-interfacility)		2,239	0	2,3
	Visual Touch-and-Go		1,660	0	1,0
		TOTAL	6,297	59	6,3
Transient Jet	Southeasterly Departure		46	2	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Northeasterly Departure		901	18	,
	Straight-In/Full stop Arrival (non-interfacility)		284	9	:
	Overhead Arrival at Oceana (non-interfacility)		669	5	
	Visual Touch-and-Go	1	1,084	32	1,
	1		724	22	•••
	GCA Box	TOTAL	3,708	88	3,
		TOTAL			
Transient Prop	Southeasterly Departure	- 1	174	3	
	Northeasterly Departure	j	1,459	28	1,
	Straight-In/Full stop Arrival (non-interfacility)		665	12	
	Overhead Arrival at Oceana (non-interfacility)	1	978	9	
	Visual Touch-and-Go	j	3,259	61	3,
	GCA Box	- 1	2,178	36	2,
		TOTAL	8,713	149	8,



Table A-17: Annual Flight Track Operations at NALF Fentress for the Baseline Scenario

		Airfield Operations			
Aircraft Category	Operation Type	<b>Day</b> 0700-2200	Night 2200-0700	Total	
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)	1,750	665	2,415	
	FCLP Pattern	21,899	11,911	33,810	
	Interfacility Departure to Oceana	1,425	990	2,415	
	TOTAL	25,074	13,566	38,640	
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)	965	320	1,285	
	FCLP Pattern	14,166	6,544	20,710	
	Interfacility Departure to Oceana	815	470	1,285	
	TOTAL	15,946	7,334	23,280	
E-2 Fleet	Arrival (w/ overhead approach)	112	56	168	
	FCLP Pattern	9,543	6,921	16,464	
	Departure :	88	. 80	168	
	TOTAL	9,743	7,057	16,800	
E-2 FRS	Arrival (w/ overhead approach)	459	157	616	
	FCLP Pattern	10,833	5,535	16,368	
	Departure	349	267	616	
	TOTAL	11,641	5,959	17,600	
C-2 Fleet	Arrival (w/ overhead approach)	106	6	112	
	FCLP Pattern	7,566	558	8,124	
	Departure	100	12	112	
	TOTAL	7,772	576	8,348	
	AIRFIELD TOTAL	70,176	34,492	104,668	

Table A-18: Annual Flight Track Operations at NALF Fentress for ARS-1

			Airfield Operations			
Aircraft Category	Operation Type		Day 0700-2200	Night 2200-0700	Total	
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		1,390	995	2,385	
	FCLP Pattern	i	17,918	15,472	33,390	
	Interfacility Departure to Oceana		1,200	1,185	2,385	
		TOTAL	20,508	17,652	38,160	
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		880	415	1,295	
	FCLP Pattern		13,147	7,723	20,870	
	Interfacility Departure to Oceana		775	520	1,295	
		TOTAL	14,802	8,658	23,460	
F/A-18 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		1,305	880	2,185	
	FCLP Pattern	1	15,179	9,791	24,970	
	Interfacility Departure to Oceana	Ī	1,145	1,040	2,185	
		TOTAL	17,629	11,711	29,340	
F/A-18 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		1,122	395	1,517	
	FCLP Pattern	i	15,048	6,404	21,452	
	Interfacility Departure to Oceana		1,017	500	1,517	
		TOTAL	17,187	7,299	24,486	
E-2 Fleet	Arrival (w/ overhead approach)		94	74	168	
	FCLP Pattern	[	7,713	8,751	16,464	
	Departure		66	102	168	
		TOTAL	7,873	8,927	16,800	
E-2 FRS	Arrival (w/ overhead approach)	7	444	172	616	
	FCLP Pattern		9,558	6,810	16,368	
	Departure	į	289	327	616	
		TOTAL	10,291	7,309	17,600	
C-2 Fleet	Arrival (w/ overhead approach)		108	4	112	
	FCLP Pattern	1	7,654	470	8,124	
	Departure		98	14	112	
		TOTAL	7,860	488	8,348	
	AIRF	ELD TOTAL	96,150	62,044	158,194	



A-22

Table A-19: Annual Flight Track Operations at NALF Fentress for ARS-2

		Airfield Operations			
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		1,375	975	2,350
1-141 660	FCLP Pattern	ļ	17,714	15,186	32,900
	Interfacility Departure to Oceana	1	1,185	1,165	2,350
	Interreducing Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of Department of De	TOTAL	20,274	17,326	37,600
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		830	455	1,285
1-141110	FCLP Pattern		12,412	8,298	20,710
	Interfacility Departure to Oceana		730	555	1,285
	minima in a second	TOTAL	13,972	9,308	23,280
F/A-18 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		995	655	1,650
1/A-10 Fica	FCLP Pattern		11,690	7,230	18,920
	Interfacility Departure to Oceana		885	765	1,650
	minutes in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	TOTAL	13,570	8,650	22,220
F/A-18 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		1,189	310	1,499
174-101110	FCLP Pattern		15,482	5,712	21,194
	Interfacility Departure to Oceana		1,029	470	1,499
		TOTAL	17,700	6,492	24,192
E-2 Fleet	Arrival (w/ overhead approach)		98	70	168
L L 1 1001	FCLP Pattern		8,350	8,114	16,464
	Departure		72	96	168
		TOTAL	8,520	8,280	16,800
E-2 FRS	Arrival (w/ overhead approach)		446	170	616
	FCLP Pattern		9,752	6,616	16,368
	Departure		301	315	616
		TOTAL	10,499	7,101	17,600
C-2 Fleet	Arrival (w/ overhead approach)		106	6	112
	FCLP Pattern		7,500	624	8,124
	Departure		98	14	112
	<u> </u>	TOTAL	7,704	644	8,348
	AIRFIE	LD TOTAL	92,239	57,801	150,040

Table A-20: Annual Flight Track Operations at NALF Fentress for ARS-3

			Airfield Operations			
Aircraft	Operation Type		Day	Night	Total	
Category		ŀ	0700-2200	2200-0700		
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		1,470	935	2,405	
	FCLP Pattern		18,788	14,882	33,670	
	Interfacility Departure to Oceana	1	1,250	1,155	2,405	
		TOTAL	21,508	16,972	38,480	
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		875	450	1,325	
	FCLP Pattern		12,945	8,405	21,350	
	Interfacility Departure to Oceana		755	570	1,325	
		TOTAL	14,575	9,425	24,000	
F/A-18 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		865	565	1,430	
	FCLP Pattern	- 1	10,184	6,176	16,360	
	Interfacility Departure to Oceana	1	780	650	1,430	
		TOTAL	11,829	7,391	19,220	
F/A-18 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		1,126	380	1,506	
	FCLP Pattern	l	14,884	6,412	21,296	
	Interfacility Departure to Oceana		996	510	1,506	
		TOTAL	17,006	7,302	24,308	
E-2 Fleet	Arrival (w/ overhead approach)		102	66	168	
	FCLP Pattern		8,467	7,997	16,464	
	Departure		72	96	168	
		TOTAL	8,641	8,159	16,800	
E-2 FRS	Arrival (w/ overhead approach)		437	179	616	
	FCLP Pattern		9,775	6,593	16,368	
	Departure		302	314	616	
		TOTAL	10,514	7,086	17,600	
C-2 Fleet	Arrival (w/ overhead approach)		106	6	112	
	FCLP Pattern		7,591	533	8,124	
	Departure		98	14	112	
		TOTAL	7,795	553	8,348	
	AIRFI	ELD TOTAL	91,868	56,888	148,756	



Table A-21: Annual Flight Track Operations at NALF Fentress for ARS-4

			irfield Operations	
Aircraft	Operation Type	Day	Night	Total
Category		0700-2200	2200-0700	
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)	1,435	945	2,38
	FCLP Pattern	18,367	14,953	33,320
	Interfacility Departure to Oceana	1,225	1,155	2,380
	TOT	AL 21,027	17,053	38,086
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)	830	455	1,28
	FCLP Pattern	12,149	8,561	20,710
	Interfacility Departure to Oceana	700	585	1,285
	тот	AL 13,679	9,601	23,280
F/A-18 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)	785	505	. 1,290
	FCLP Pattern	9,235	5,465	14,700
	Interfacility Departure to Oceana	720	570	1,290
	тот	AL 10,740	6,540	17,280
F/A-18 FRS	Interfacility Arrival from Oceana (w/ overhead approach)	1,179	325	1,504
	FCLP Pattern	15,620	5,644	21,264
	Interfacility Departure to Oceana	1,049	455	1,504
	. TOT	AL 17.848	6,424	24,272
E-2 Fieet	Arrival (w/ overhead approach)	102	66	168
	FCLP Pattern	8.304	8,160	16,464
	Departure	66	102	168
	ТОТ	AL 8,472	8.328	16,800
E-2 FRS	Arrival (w/ overhead approach)	434	182	616
	FCLP Pattern	9,574	6.794	16,368
	Departure	299	317	616
	ТОТ	AL 10,307	7,293	17.600
C-2 Fleet	Arrival (w/ overhead approach)	106	6	112
	FCLP Pattern	7,591	533	8,124
	Departure	98	14	112
	ТОТ	AL 7,795	553	8,348
	AIRFIELD TOT		55,792	145,660

Table A-22: Annual Flight Track Operations at NALF Fentress for ARS-5

			A	irfield Operations	
Aircraft	Operation Type		Day	Night	Total
Category		1	0700-2200	2200-0700	
F-14 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		1,450	925	2,375
	FCLP Pattern		18,650	14,600	33,250
	Interfacility Departure to Oceana		1,245	1,130	2,375
		TOTAL	21,345	16,655	38.000
F-14 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		885	420	1,305
	FCLP Pattern	ı	12,993	8,037	21,030
	Interfacility Departure to Oceana		750	555	1,305
		TOTAL	14,628	9.012	23,640
F/A-18 Fleet	Interfacility Arrival from Oceana (w/ overhead approach)		800	510	1,310
	FCLP Pattern	ľ	9,311	5,629	14,940
	Interfacility Departure to Oceana		715	595	1,310
		TOTAL	10,826	6.734	17,560
F/A-18 FRS	Interfacility Arrival from Oceana (w/ overhead approach)		1,154	345	1.499
	FCLP Pattern	- 1	15,188	6,006	21,194
	Interfacility Departure to Oceana	1	1,014	485	1,499
		TOTAL	17,356	6.836	24,192
E-2 Fleet	Arrival (w/ overhead approach)		98	70	168
	FCLP Pattern		8,390	8,074	16,464
	Departure		70	98	168
		TOTAL	8,558	8.242	16,800
E-2 FRS	Arrival (w/ overhead approach)		434	182	616
	FCLP Pattern		9,574	6,794	16,368
	Departure		299	317	616
		TOTAL	10,307	7,293	17,600
C-2 Fleet	Arrival (w/ overhead approach)		106	6	112
	FCLP Pattern		7,566	558	8,124
	Departure		100	12	112
		TOTAL	7,772	576	. 8,348
	AIRFIE	LDTOTAL	90,792	55,348	146,140



Table A-23: Annual Flight Track Operations at MCAS Cherry Point for the Baseline Scenario

Aircraft	Operation Type	$\neg \uparrow$	Day	irfield Operations Night	Total
	Operation Type	i	0700-2200	2200-0700	
Category V-8 Fleet	Departure		6,564	28	6,5
v-o rieci	Interfacility Departure to Bogue Field		312	o	3
	Interfacility Arrival from Bogue Field (w/ overhead approach)		90	o	
			222	o	2
	Interfacility Arrival from Bogue Field (w/ straight-in approach)		748	67	
	Straight-In/Full stop Arrival (non-interfacility)			198	5.7
•	Overhead Arrival at Cherry Point to Runway (non-interfacility)		5,570	1	5,7
	Overhead Arrival at Cherry Point to Pad (non-interfacility)	İ	20	2	
	Depart and Reenter to Overhead		138	0	•
	Visual Touch-and-Go		4,874	448	5,3
	Full Circuit to Runway		5,000	172	5,
	Full Circuit to Pad		1,034	16	1,0
	GCA Box	l l	1,728	10	1,3
	Press-Up		6,666	20	6.0
	1 · · · · · · · · · · · · · · · · · · ·		2.804	182	2,
	Pad Vertical Take-off to Pad Landing Circuit	OTAL		1,143	36,
		OTAL	35,770	0	4,4
V-8 FRS	Departure		4,421	- 1	
	Interfacility Departure to Bogue Field	- 1	352	0	;
	Interfacility Arrival from Bogue Field (w/ overhead approach)	- 1	348	0	;
	Interfacility Arrival from Bogue Field (w/ straight-in approach)		4	0	
	Straight-In/Full stop Arrival (non-interfacility)		1,606	25	1,0
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	- 1	1,454	o	1,4
	Overhead Arrival at Cherry Point to Pad (non-interfacility)	- 1	1,332	4	1,
			407	0	•,
	Depart and Reenter to Overhead	- 1		98	2.
	Visual Touch-and-Go		2,381		
	Full Circuit to Runway	- 1	10,624	214	10,
	Full Circuit to Pad	- 1	2,638	118	2,
	GCA Box	- 1	2,004	16	2,
	Press-Up	1	6,476	70	6,
	Pad Vertical Take-off to Pad Landing Circuit	1	2,518	122	2,
		OTAL	36,565	667	37.
· A OD			2,119	7	2.
A-6B	Departure			i i	-,
	Interfacility Arrival from Bogue Field (w/ straight-in approach)		-6		
	Straight-In/Full stop Arrival (non-interfacility)		798	117	
	Overhead Arrival at Cherry Point to Runway (non-interfacility)		1,189	17	1,
	Depart and Reenter to Overhead	1	332	78	
	Visual Touch-and-Go		5,990	456	6,
	GCA Box		564	52	
		OTAL	10,998	727	11.
(O 400 Fl)		UIAL	632	0	
CC-130 Fleet	Departure Page 11 (1)		I	ő	
	Interfacility Arrival from Bogue Field (w/ straight-in approach)	l l	5		
	Straight-In/Full stop Arrival (non-interfacility)	- 1	552	36	
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	- 1	33	6	
	Visual Touch-and-Go	- 1	1,709	159}-	1,
	GCA Box	- 1	1,220	2	1,
		OTAL	4,151	203	4,
(C-130 FRS	Departure		691	0	
10-1301110	Straight-In/Full stop Arrival (non-interfacility)	- 1	651	40	
		- 1	3,602	182	3,
	Visual Touch-and-Go	- 1			
	GCA Box	- 1	3,220	54	3,
	Depart and Reenter to Overhead		464	0	
		OTAL	8,628	276	8,
Fransient Jet	Departure		1,785	49	1,
	Straight-In/Full stop Arrival (non-interfacility)	1	1,252	1	1,
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	1	581	0	
	Visual Touch-and-Go	-	1,336	o	1,
	GCA Box		980	ō	•
		OTAL	5,934	50	5.
		O'AL			
ransient Prop	Departure		755		
	Straight-In/Full stop Arrival (non-interfacility)		755	1	
	Visual Touch-and-Go		2,628	0	2,
	GCA Box		166	0	
	Т	OTAL	4,304	2	4,
ransient Heavy	Departure		116	67	
	Straight-In/Full stop Arrival (non-interfacility)		181	2	
	GCA Box		340	o	
		OTAI	637	69	
		OTAL			
Fransient Large	Departure	1	535	159	
	Straight-In/Full stop Arrival (non-interfacility)	- 1	687	7	
	GCA Box	1	938	6	
	T	OTAL	2,160	172	. 2
ransient Helicopter	Departure		1,494	405	1
	Straight-In/Full stop Arrival (non-interfacility)	- 1	1,866	33	1
				438	3
	7	OTAL	3,360		



Table A-24: Annual Flight Track Operations at MCAS Cherry Point for ARS-3

Aire m44	0	<del></del>	Airfield Operations	
Aircraft Category	Operation Type	Day	Night	Total
AV-8 Fleet	Departure	0700-2200	2200-0700	6,50
	Interfacility Departure to Bogue Field	324		3:
	Interfacility Arrival from Bogue Field (w/ overhead approach)	90		
	Interfacility Arrival from Bogue Field (w/ straight-in approach)	234		2
	Straight-In/Full stop Arrival (non-interfacility)	762	89	8
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	5,496		5.7
	Overhead Arrival at Cherry Point to Pad (non-interfacility)	20	-1	
	Depart and Reenter to Overhead Visual Touch-and-Go	130	1 -1	1
	Full Circuit to Runway	4,417 4,766		4,8
	Full Circuit to Pad	1,028		4,9 1,0
	GCA Box	1,704		1,7
	Press-Up	6,648		6,6
	Pad Vertical Take-off to Pad Landing Circuit	2,674		2,8
	TOT	AL 34,802	1,224	36,0
AV-8 FRS	Departure	4,404		4,4
	Interfacility Departure to Bogue Field	355		3
	Interfacility Arrival from Bogue Field (w/ overhead approach) Interfacility Arrival from Bogue Field (w/ straight-in approach)	351		3
	Straight-In/Full stop Arrival (non-interfacility)	1,625	0 24	1,6
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	1,433		1,0
	Overhead Arrival at Cherry Point to Pad (non-interfacility)	1,319	4	1,3
	Depart and Reenter to Overhead	403	o	4
	Visual Touch-and-Go	2,362	69	2,4
	Full Circuit to Runway	10,204	182	10,3
	Full Circuit to Pad	2,556	96	2,6
	GCA Box	1,942		1,9
	Press-Up	6,352	62	6,4
	Pad Vertical Take-off to Pad Landing Circuit	2,438		2,5
EA-6B	TOT Departure			36,2
J. 05	Interfacility Arrival from Bogue Field (w/ straight-in approach)	2,116 6	11 0	2,12
	Straight-In/Full stop Arrival (non-interfacility)	803	126	92
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	1,173	20	1,19
	Depart and Reenter to Overhead	328	86	4
	Visual Touch-and-Go	5,919	497	6,4
	GCA Box	540	56	59
-/A-18 Fleet	TOT		796	11,68
-/A-10 Fieel	Departure Straight-In/Full stop Arrival (non-interfacility)	2,851	58	2,9
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	556	130	68
	Depart and Reenter to Overhead	2,175 75	44	2,21
	Visual Touch-and-Go	5,059	433	5,49
	FCLP Pattern	9,061	2,542	11,60
	GCA Box	. 80	0	,
(O 400 F)		19,857	3,207	23,00
C-130 Fleet	Departure	631	0	63
	Interfacility Arrival from Bogue Field (w/ straight-in approach)	6	0	
	Straight-In/Full stop Arrival (non-interfacility) Overhead Arrival at Cherry Point to Runway (non-interfacility)	549	38	58
	Visual Touch-and-Go	32 1,704	6 176	3
	GCA Box	1,704	176	1,88
	TOT		230	1,22
(C-130 FRS	Departure	690	0	4,30
	Straight-In/Full stop Arrival (non-interfacility)	647	43	69
	Visual Touch-and-Go	3,664	98	3,76
	GCA Box	3,150	54	3,20
	Depart and Reenter to Overhead	476	0	47
ransient Jet	Departure TOT		195	8,82
	Straight-In/Full stop Arrival (non-interfacility)	1,791	41	1,83
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	1,250 581	1 0	1,25 58
	Visual Touch-and-Go	1,304	8	1,30
	GCA Box	960	6	96
	TOTA		42	5,92
ransient Prop	Departure	753	1	75
	Straight-In/Full stop Arrival (non-interfacility)	753	1	75
	Visual Touch-and-Go GCA Box	2,594	0	2,59
		164	0	16
ransient Heavy	Departure TOT/		2	4,26
	Straight-In/Full stop Arrival (non-interfacility)	110 181	73	18 18
	GCA Box	328	0	18 32
	TOTA		75	69
ransient Large	Departure	539	155	69
	Straight-In/Full stop Arrival (non-interfacility)	686	8	69
	GCA Box	914	. 6	92
ranciant Halianatas	TOTA		169	2,30
ransient Helicopter	Departure	1,481	417	1,89
	Straight-In/Full stop Arrival (non-interfacility)	1,865	33	1,89
	TOTA	L 3,346	450	3,79

Table A-25: Annual Flight Track Operations at MCAS Cherry Point for ARS-5

Airon	Operation Type	<del>-  </del>	Day	irfield Operations Night	Total
Aircraft	Operation Type	1	0700-2200	2200-0700	. 0.2.
Category V-8 Fleet	Departure		6,536	56	6,59
V-6 FIEEL	Interfacility Departure to Bogue Field		318	0	31
	Interfacility Arrival from Bogue Field (w/ overhead approach)		84	o l	٤
	interfacility Arrival from Bogue Field (w/ straight-in approach)		234	0	23
	Straight-In/Full stop Arrival (non-interfacility)		780	94	87
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	1	5,510	199	5,70
*	Overhead Arrival at Cherry Point to Pad (non-interfacility)		18	2	2
	Depart and Reenter to Overhead		135	0	13
	Visual Touch-and-Go		4,598	389	4,98
	Full Circuit to Runway		4,852	178	5,03
	Full Circuit to Pad		1,034	24	1,05
	GCA Box	- 1	1,710	8	1,71
	Press-Up		6,604	10	6,61
	Pad Vertical Take-off to Pad Landing Circuit		2,708	204	2,91
		TOTAL	35,121	1,164	36,28
V-8 FRS	Departure		4,416	3	4,41
	Interfacility Departure to Bogue Field		352	0	35
	Interfacility Arrival from Bogue Field (w/ overhead approach)		344	0	34
	Interfacility Arrival from Bogue Field (w/ straight-in approach)		0	0	
	Straight-In/Full stop Arrival (non-interfacility)		1,626	30	1,65
	Overhead Arrival at Cherry Point to Runway (non-interfacility)		1,462	0	1,46
	Overhead Arrival at Cherry Point to Pad (non-interfacility)		1,309	0	1,30
	Depart and Reenter to Overhead	- 1	402	0	40
	Visual Touch-and-Go	- 1	2,314	80	2,39
	Full Circuit to Runway		10,304	214	10,5
	Full Circuit to Pad		2,574	90	2,60
	GCA Box	- 1	1,912	12	1,93
	Press-Up	- 1	6,396	58 96	6,45 2,53
	Pad Vertical Take-off to Pad Landing Circuit	TOTAL	2,438	583	36,43
		TOTAL	35,849 2,115	14	2.12
A-6B	Departure	1	2,115	' <del>0</del>	2,12
	Interfacility Arrival from Bogue Field (w/ straight-in approach)	1	792	132	92
	Straight-In/Full stop Arrival (non-interfacility)	- 1	1,187	17	1,20
	Overhead Arrival at Cherry Point to Runway (non-interfacility)	- 1	325	83	40
	Depart and Reenter to Overhead	- 1	5,878	504	6,38
	Visual Touch-and-Go	- 1	560	48	60
	GCA Box	TOTAL	10,857	798	11,65
/A-18 Fieet	Departure	TOTAL	4,766	141	4,90
/A-18 FIBEL	Straight-In/Full stop Arrival (non-interfacility)	- 1	858	356	1,21
	Overhead Arrival at Cherry Point to Runway (non-interfacility)		3,573	120	3,69
	Depart and Reenter to Overhead	1	124	0	12
	Visual Touch-and-Go	1	8,429	896	9,33
	FCLP Pattern	i	10,492	2,821	13,3
	IGCA Box	l	112	0	11
			28,354	4,334	32,68
C-130 Fleet	Departure		632	0	63
	Interfacility Arrival from Bogue Field (w/ straight-in approach)	l	20	0	3
	Straight-In/Full stop Arrival (non-interfacility)		536	38	5
	Overhead Arrival at Cherry Point to Runway (non-interfacility)		34	4	
	Visual Touch-and-Go	j	1,713	137	1,8
	GCA Box		1,198	8	1,2
		TOTAL	4,133	187	4,3
C-130 FRS	Departure		691	0	6
	Straight-In/Full stop Arrival (non-interfacility)	1	646	45	6
	Visual Touch-and-Go	ľ	3,673	137	3,8
	GCA Box	ŀ	3,200	38	3,2
	Depart and Reenter to Overhead		476	0	4
		TOTAL	8,686	220	8,9
ransient Jet	Departure		1,691	36	1,7
	Straight-In/Full stop Arrival (non-interfacility)		1,145	1	1,1
	Overhead Arrival at Cherry Point to Runway (non-interfacility)		581	0	5
	Visual Touch-and-Go		1,184	0	1,1
	GCA Box	TOT:-	988	0	9
		TOTAL	5,589	37	5,6
ransient Prop	Departure	1	755	1	
	Straight-In/Full stop Arrival (non-interfacility)	I	755	1	7
	Visual Touch-and-Go	I	2,570	0	2,5
	GCA Box	TOTAL	158	0	1
		TOTAL	4,238	2	4,2
ransient Heavy	Departure		118	65	1
	Straight-In/Full stop Arrival (non-interfacility)		181	2	
	GCA Box		324	0	
		TOTAL	623	67	
ransient Large	Departure	T	530	164	
•	Straight-In/Full stop Arrival (non-interfacility)	- 1	686	8	4
	GCA Box		910	6	
		TOTAL	2,126	178	2,3
ransient Helicopter	Departure		1,501	398	1,8
larisierik melicopter					
ansierik Helicopter	Straight-In/Full stop Arrival (non-interfacility)	TOTAL	1,866 3,367	33 431	1, 3,



Table A-26: Annual Flight Track Operations at MCALF Bogue Field for the Baseline Scenario

			A	irfield Operations	
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
AV-8 Fleet	Interfacility Arrival from Cherry Point		312	0	312
	FCLP Pattern		2,880	0	2,880
	Forward Base Operations Pattern		2,472	0	2,472
	Interfacility Departure to Cherry Point		312	o	312
*		TOTAL	5,976	0	5,976
AV-8 FRS	Interfacility Arrival from Cherry Point		352	0	352
	FCLP Pattern		3,696	o	3,696
	Forward Base Operations Pattern		4,840	0	4,840
	Interfacility Departure to Cherry Point		352	0	352
		TOTAL	9,240	0	9,240
EA-6B	Arrival (non-interfacility)		6	0	6
	Expeditionary Airfield Operations		24	0	24
	Interfacility Departure to Cherry Point		6	0	. 6
		TOTAL	36	0	36
KC-130 Fleet	Arrival (non-interfacility)		5	0	5
	Normal Pattern Operations		10	o	10
	Interfacility Departure to Cherry Point		5	0	5
		TOTAL	20	0	20
Marine Corps Helicopter	Arrivals/Departures/Pattern Operations		960	50	1,010
Other Military Jet	Arrivals/Departures/Pattern Operations		790	135	925
Other Military Helicopter	Arrivals/Departures/Pattern Operations		110	20	130
		AIRFIELD TOTAL	17,132	205	17,337



## A.3 Lightship and Sanders Approach Data for NAS Oceana

Table A-27: Lightship and Sanders Approaches for Baseline Scenario

		F-14	Fleet	F-14	FRS	Adve	rsary
		Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8,712	326	2,873	83	685	2
	Visual Straight-in Arrival	0	0	613	0	0	
Lightship	Overhead Arrival	1,226	60	891	15	57	(
	Visual Straight-in Arrival	0	0	283	0	0	(
	Instrument Arrivals	450	25	793	86	89	
Tot	al Overhead Arrivals (ni)	9,938	386	3,764	98	742	2
	al Straight-In Arrivals (ni)	450	25	1,689	86	89	(

Table A-28: Lightship and Sanders Approaches for ARS-1

		F-14	Fleet	F-14	FRS	F/A-18 Fleet		F/A-18	B FRS	Adve	rsary
		Day	Night	Dav	Night	Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8.270	320	2,850	72	8,706	330	3,127	191	1,982	0
<b>J</b>	Visual Straight-in Arrival	48	9	618	o	49	18	166	25	15	0
Lightship	Overhead Arrival	1,745	60	890	16	1,840	94	1,433	3	234	0
_5	Visual Straight-in Arrival	13	1	304	0	15	0	8	0	2	0
	Instrument Arrivals	403	31	752	132	1,629	599	1,803	255	99	1
To	tal Overhead Arrivals (ni)	10.015	380	3,740	88	10,546	424	4,560	194	2,216	C
	al Straight-In Arrivals (ni)	464				1,693	617	1,977	280	116	1

Table A-29: Lightship and Sanders Approaches for ARS-2

		F-14	Fleet	F-14	FRS	F/A-18	Fleet	F/A-18	BFRS	Adve	rsary
		Dav	Night	Dav	Night	Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8,286	290	2,859	72	7,466	303	3,211	175	1,693	0
	Visual Straight-in Arrival	45	11	619	0	34	15	122	36	0	0
Lightship	Overhead Arrival	1,657	54	893	16	1,524	77	1,444	3	229	C
	Visual Straight-in Arrival	10	3	296	0	10	3	4	0	0	O
	Instrument Arrivals	417	37	787	93	1,409	507	1,801	233		1
To	al Overhead Arrivals (ni)	9.943	344	3,752	88	8,990	380	4,655	178		
	al Straight-In Arrivals (ni)	472	51	1,702	93	1,453	525	1,927	269	94	1



Table A-30: Lightship and Sanders Approaches for ARS-3

		F-14	Fleet	F-14	FRS	F/A-18 Fleet		F/A-1	B FRS	Adve	rsary
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8,346	324	2,872	65	6,277	265	3,125	198	2,017	0
	Visual Straight-in Arrival	18	8	613	0	4	1	175	17	2	0
Lightship	Overhead Arrival	1,633	66	896	15	1,330	67	1,464	4	215	0
	Visual Straight-in Arrival	3	4	293	o	o	1	Ó	0	0	0
	Instrument Arrivals	419	29	776	104	1,218	398	1,783	252	93	1
Tot	al Overhead Arrivals (ni)	9,979	390	3,768	80	7,607	332	4,589	202	2,232	0
Tot	al Straight-In Arrivals (ni)	440	41	1,682	104	1,222	400	1,958	269	95	1

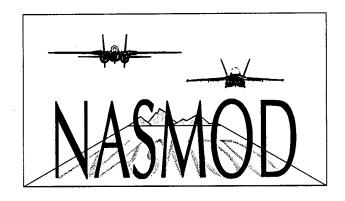
Table A-31: Lightship and Sanders Approaches for ARS-4

		F-14	Fleet	F-14	FRS	F/A-18	3 Fleet	F/A-1	B FRS	Adve	rsary
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8,398	299	2,861	64	5,181	164	3,151	194	1,537	0
	Visual Straight-in Arrival	36	4	620	5	33	1	172	19	. 3	0
Lightship	Overhead Arrival	1,567	67	894	10	970	47	1,429		213	0
	Visual Straight-in Arrival	5	2	301	1	7	1	5	0	0	ō
	Instrument Arrivals	445	25	778	102	981	266	1,807	229	95	2
	al Overhead Arrivals (ni)	9,965	366	3,755	74	6,151	211	4,580	198	1,750	0
Tota	al Straight-In Arrivals (ni)	486	31	1,699	108	1,021	268	1,984	248	98	2

Table A-32: Lightship and Sanders Approaches for ARS-5

		F-14	Fleet	F-14	FRS	F/A-18	Fleet	F/A-1	8 FRS	Adve	rsary
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
		0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -	0700 -	2200 -
		2200	0700	2200	0700	2200	0700	2200	0700	2200	0700
Sanders	Overhead Arrival	8,394	312	2,879	78	5,095	154	3,139	197	2,024	
	Visual Straight-in Arrival	41	2	622	0	16	2		24	3	n
Lightship	Overhead Arrival	1,566	62	897	16		44	1,440		215	0
	Visual Straight-in Arrival	6	2	290	0	' '	2	4	0	1	0
	Instrument Arrivals	427	31	779	103	986	260	1,806	244	105	0
	al Overhead Arrivals (ni)	9,960	374	3,776	94	6,132	198	4.579	203	2,239	0
Tota	al Straight-In Arrivals (ni)	474	35	1,691	103	1.006	264	1,961	268	109	0





APPENDIX B: TRAINING AREA UTILIZATION

## APPENDIX B: TRAINING AREA UTILIZATION

This section contains tables of training area sorties and exclusive-use training area utilization data for each of the scenarios.

In reviewing and comparing quantitative results, note that, unless otherwise discussed in the text (Section 3), each of the alternatives should be compared against the baseline scenario. Since the results are dependent upon airwing compositions as well as base loading, comparisons between the alternative scenarios may result in misleading conclusions. Some variation is to be expected due to random behavior designed into the model.

## **B.1 Training Area Sorties**

An area sortic represents one aircraft entering a region of airspace, operating there for a period of time, and leaving. Note that for reporting purposes, W-72 TACTS range sorties are not included in W-72 totals, and BT-9 and BT-11 sorties are not included in R-5306A totals.

The aircraft categories given in the tables comprise the significant service users for the training areas. For the overland areas, BT-9, BT-11, Navy Dare, Fort Pickett (R-6602), Stumpy Point (R-5313A), and the MTRs, each aircraft category is defined by a type of airframe (e.g., F-14, F-16) and type of squadron (e.g., Fleet, FRS). For example, while the majority of the F-14 sorties to BT-11 originate from NAS Oceana, a number of these sorties originate from aircraft carriers positioned off the Atlantic coast and are categorized, therefore, as F-14 (Other Navy).

Because of the nature of historical utilization reports, it is more difficult to compile a comprehensive list of airframes for the more commonly used over-water areas. In this case, aggregate categories are defined in the model by type of user/service. These users are described below.

Adversary Naval adversary squadron aircraft including F-14, F/A-18,

and F-5 aircraft.

Navy Other Naval aircraft from non-NAS Oceana points of origin

including C-2/E-2, S-3, P-3 aircraft, as well as Navy

helicopters.

Air Force Jets Primarily F-15 and F-16 aircraft.

Air Force Other Primarily large Air Force aircraft such as C-141, C-5, and

KC-135.

Marine Corps Includes a wide variety of aircraft such as jets, tankers, and

helicopters.

Coast Guard Primarily C-130 and helicopter aircraft.



B-1

NASA This category indicates the number of NASA operations

that require exclusive use of the airspace. These operations are primarily missile launches from NASA Wallops Flight

Facility.

Contractor

Primarily Learjet and Mitsubishi aircraft flown in support of

military operations.

Civilian

Primarily commercial carriers.

Army Helicopters

Includes AH-64, OH-58, and UH-60 helicopters.



Table B-1: Annual W-72 TACTS Range Sorties

		Baseline			ARS-1		_	ARS-2	
	Day	Night		Day	Night		Day	Night	
User/Service Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
User/Service Category	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	2,869	47	2,916	1,877	21	1,898	2,048	26	2,074
F-14 (NAS Oceana FRS)	543	0	543	546	0	546	543	0	543
F/A-18 (NAS Oceana Fleet)	_	_		3,198	31	3,229	2,812	34	2,846
F/A-18 (MCAS Cherry Point Fleet)					-	-	-	-	_
F/A-18 (NAS Oceana FRS)	_	_	_	138	0	138	157	0	157
Adversary	612	14	626	1,718	25	1,743	1,433	19	1,452
	704	11	715	459	16	475	479	20	499
Air Force Jets	,,,,								
Air Force Jets TOTAL	4,728	72	4,800	7,936	93	8,029	7,472	99	7,571
			4,800	7,936	'	8,029	7,472		7,571
			4,800	7,936	ARS-4	8,029	-	ARS-5	7,571
		72	4,800	7,936 Day	'	8,029	Day	ARS-5	
TOTAL	4,728	72 ARS-3	4,800	·	ARS-4	8,029 Total	<b>Day</b> 0700-	ARS-5 Night 2200-	7,571
	4,728 Day	72 ARS-3 Night		Day	ARS-4 Night	Total	<b>Day</b> 0700- 2200	ARS-5 Night 2200- 0700	Total
TOTAL User/Service Category	4,728 Day 0700-	72 ARS-3 Night 2200-		<b>Day</b> 0700-	ARS-4 Night 2200-		Day 0700- 2200 1,942	ARS-5 Night 2200-	Total
User/Service Category F-14 (NAS Oceana Fleet)	4,728 <b>Day</b> 0700- 2200	72 ARS-3 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-4 Night 2200- 0700	Total	<b>Day</b> 0700- 2200 1,942 551	ARS-5 Night 2200- 0700 31 0	Total 1,973 551
User/Service Category F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS)	4,728 Day 0700- 2200 1,990	72 ARS-3 Night 2200- 0700 21 0	<b>Total</b> 2,011	Day 0700- 2200 2,238 546	ARS-4 Night 2200- 0700 33 0	<b>Total</b> 2,271	Day 0700- 2200 1,942 551 1,992	ARS-5 Night 2200- 0700 31 0 25	1,973 551 2,017
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet)	<b>Day</b> 0700- 2200 1,990 548	72 ARS-3 Night 2200- 0700 21 0	<b>Total</b> 2,011 548	Day 0700- 2200 2,238 546	ARS-4 Night 2200- 0700 33 0 11	Total 2,271 546 2,164	Day 0700- 2200 1,942 551 1,992 536	ARS-5 Night 2200- 0700 31 0 25 0	1,973 551 2,017 536
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet)	<b>Day</b> 0700- 2200 1,990 548 2,286	72 ARS-3 Night 2200- 0700 21 0 28	<b>Total</b> 2,011 548 2,314	<b>Day</b> 0700- 2200 2,238 546	ARS-4 Night 2200- 0700 33 0 11 —	Total 2,271 546 2,164 — 165	Day 0700- 2200 1,942 551 1,992 536 153	ARS-5 Night 2200- 0700 31 0 25 0	1,973 551 2,017 536 153
User/Service Category F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS)	4,728 Day 0700- 2200 1,990 548 2,286 457	72 ARS-3 Night 2200- 0700 21 0 28 0	2,011 548 2,314 457	Day 0700- 2200 2,238 546 2,153 — 165 1,311	ARS-4 Night 2200- 0700 33 0 11 — 0	7otal 2,271 546 2,164 — 165 1,326	Day 0700- 2200 1,942 551 1,992 536 153 1,724	ARS-5 Night 2200- 0700 31 0 25 0 0	1,973 551 2,017 536 153
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) F/A-18 (NAS Oceana FRS)	4,728 Day 0700- 2200 1,990 548 2,286 457 113	72 ARS-3 Night 2200- 0700 21 0 28 0 0	7otal 2,011 548 2,314 457 113	Day 0700- 2200 2,238 546 2,153 — 165	ARS-4 Night 2200- 0700 33 0 11 — 0	Total 2,271 546 2,164 — 165	Day 0700- 2200 1,942 551 1,992 536 153	ARS-5 Night 2200- 0700 31 0 25 0	1,973 551 2,017 536 153

Table B-2: Annual Phelps MOA Sorties

		Baseline			ARS-1			ARS-2	
Aircraft Category	<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total
F/A-18 (NAS Oceana Fleet)	_	_	_	276	0	276	242	0	242
F/A-18 (MCAS Cherry Point Fleet)		_		_					
							040		242
TOTAL	0	0	0	276	0	276	242	0	242
TOTAL	0  	0 ARS-3	o <sub>l</sub> 	276	ARS-4	2/6	242	ARS-5	242
TOTAL  Aircraft Category	<b>Day</b> 0700-2200	-1	Total	276 Day 0700- 2200	,	Total	<b>Day</b> 0700-2200	- 1	Total
Aircraft Category	<b>Day</b> 0700-	ARS-3 Night 2200-		<b>Day</b> 0700- 2200	ARS-4 Night 2200-		<b>Day</b> 0700-	ARS-5 Night 2200-	Total
	<b>Day</b> 0700- 2200	ARS-3 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-4 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-5 Night 2200- 0700	



Table B-3: Annual Navy Dare Sorties

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	2,986	38	3,024	2,684	72	2,756	2,618	56	2,674
F-14 (NAS Oceana FRS)	1,027	0	1,027	972	o	972	997	0	997
F-14 (Other Navy)	9	0	9	9	0	9	9	0	g
F/A-18 (NAS Oceana Fleet)	_	_		1,454	198	1,652	1,346	160	1,506
F/A-18 (MCAS Cherry Point Fleet)	-		, _		_	_	_		· · <u>-</u>
F/A-18 (NAS Oceana FRS)	_	_		573	91	664	557	106	663
F/A-18 (Adversary)	12	0	12	27	0	27	24	0	24
F/A-18 (Other Navy)	53	0	53	53	o	53	53	О	53
F/A-18 (Marine Corps)	26	6	32	26	2	28	18	2	20
T-34	o	0	o	22	o	22	27	o	27
AV-8 (Fleet)	68	0	68	54	4	58	38	o	38
AV-8 (FRS)	10	0	10	6	0	6	8	o	8
EA-6B	5	0	5	5	0	5	5	0	5
A-10	14	0	14	16	0	16	20	0	20
F-15	156	4	160	106	2	108	130	10	140
F-16	346	4	350	326	2	328	312	6	318
F-16 (Air National Guard)	498	26	524	504	16	520	490	20	510
TOTAL	5,210	78	5,288	6,837	387	7,224	6,652	360	7,012
		ARS-3			ARS-4	l		ARS-5	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	2,684	80	2,764	2,700	54	2,754	2,762	48	2,810
F-14 (NAS Oceana FRS)	998	0	998	995	0	995	1,010	0	1,010
F-14 (Other Navy)	9	0	9	9	0	9	9	0	9
F/A-18 (NAS Oceana Fleet)	1,176	116	1,292	874	86	960	864	94	<b>9</b> 58
F/A-18 (MCAS Cherry Point Fleet)	86	10	96	-	-		257	68	325
F/A-18 (NAS Oceana FRS)	567	98	665	550	106	656	558	103	661
F/A-18 (Adversary)	30	0	30	19	0	19	22	0	22
F/A-18 (Other Navy)	53	0	53	53	0	53	53	0	53
F/A-18 (Marine Corps)	20	2	22	24	8	32	20	2	22
T-34	26	0	26	35	o	35	22	0	22

8



AV-8 (Fleet)

AV-8 (FRS)

F-16 (Air National Guard)

EA-6B

A-10

F-15

F-16

Table B-4: Annual BT-11 Sorties

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
Andrait datingory	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	494	2	496	688	34	722	708	28	736
F-14 (Other Navv)	30	o	30	30	0	30	30	0	30
F/A-18 (NAS Oceana Fleet)	_		-	1,394	72	1,466	1,188	74	1,262
F/A-18 (MCAS Cherry Point Fleet)	_		-		-	_	_	-	_
F/A-18 (Other Navy)	237	28	265	237	28	265	237	28	265
F/A-18 (Marine Corps)	362	22	384	354	14	368	364	26	390
AV-8 (Fleet)	1,162	36	1,198	1,082	42	1,124	1,110	30	1,140
AV-8 (FRS)	720	0	720	685	0	685	693	0	693
EA-6B	13	0	13	13	o	13	13	0	13
KC-130 (MCAS Cherry Point Fleet)	18	0	18	18	0	18	18	0	18
A-10	120	0	120	120	0	120	104	2	106
F-15	400	6	406	418	10	428	406	12	418
F-16	388	0	388	392	0	392	402	0	402
F-16 (Air National Guard)	198	0	198	202	4	206	212	0	212
AH-1	107	0	107	97	0	97	103	0	103
UH-1	43	0	43	43	0	43	40	0	40
CH-46	123	0	123	113	0	113		0	112
CH-53	13	2	15	11	2	13	11	2	13
Army Helicopters	80	8	88	72	0	72	1	0	72
Other Jets	14	3	17	21	3	24		2	24
Other Props	17	0	17	18		18		0	18
TOTAL	4,539	107	4,646	6,008	209	6,217	5,863	204	6,067
	1	ARS-3			ARS-4		1	ARS-5	
	<u> </u>		1	Barr	Milarha		Day	Night	

		ARS-3			ARS-4			ARS-5	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	686	16	702	626	4	630	640	18	658
F-14 (Other Navy)	30	0	30	30	0	30	30	0	30
F/A-18 (NAS Oceana Fleet)	974	50	1,024	794	16	810	754	18	772
F/A-18 (MCAS Cherry Point Fleet)	380	20	400	_		_	773	34	807
F/A-18 (Other Navy)	237	28	265	237	28	265	237	28	265
F/A-18 (Marine Corps)	360	16	376	340	24	364	354	22	376
AV-8 (Fleet)	1,074	42	1,116	1,106	28	1,134	1,092	42	1,134
AV-8 (FRS)	666	2	668	713	0	713	679	0	679
EA-6B	13	0	13	13	0	13	13	0	13
KC-130 (MCAS Cherry Point Fleet)	18	0	18	18	0	18	18	0	18
A-10	102	2	104	126	0	126	86	0	86
F-15	420	10	430	374	12	386	376	6	382
F-16	400	4	404	390	0	390	392	0	392
F-16 (Air National Guard)	172	4	176	218	12	230	152	2	154
AH-1	105	0	105	99	0	99	101	0	101
UH-1	43	0	43	41	0	41	40	0	40
CH-46	114	0	114	123	0	123	102	0	102
CH-53	11	0	11	11	4	15	13	2	15
Army Helicopters	80	0	80	80	0	80	70	0	70
Other Jets	16	1	17	23	0	23	21	2	23
Other Props	15	0	15	18	0	18		0	17
TOTAL	5,916	195	6,111	5,380	128	5,508	5,960	174	6,134



Table B-5: Annual BT-9 Sorties

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	68	0	68	254	30	284	192	22	214
F-14 (Other Navy)	30	o	30	30	0	30	30	0	30
F/A-18 (NAS Oceana Fleet)			-	308	32	340	204	24	228
F/A-18 (MCAS Cherry Point Fleet)	_		-		_		_	-	_
F/A-18 (Other Navy)	237	28	265	237	28	265	237	28	265
F/A-18 (Marine Corps)	190	10	200	200	20	220	194	14	208
AV-8 (Fleet)	246	6	252	256	14	270	270	10	280
AV-8 (FRS)	25	0	25	60	0	60	49	0	49
EA-6B	13	0	13	13	0	13	13	0	13
A-10	110	0	110	108	0	108	114	4	118
F-15	52	O	52	84	2	86	62	2	64
F-16	380	8	388	402	4	406	408	0	408
AH-1	78	0	78	88	0	88	82	0	82
UH-1	29	0	29	29	0	29	32	0	32
CH-46	75	0	75	85	0	85	86	0	86
CH-53	9	2	11	11	2	13	13	0	13
Army Helicopters	74	8	82	90	8	98	90	8	98
Other Jets	43	. 0	43	36	0	36	36	0	36
Other Props	20	0	20	19	0	19	19	0	19
TOTAL	1,679	62	1,741	2,310	140	2,450	2,131	112	2,243
		ARS-3			ARS-4	ı		ARS-5	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	

		ARS-3			ARS-4			ARS-5	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	232	16	248	170	4	174	216	12	228
F-14 (Other Navy)	30	0	30	30	. 0	30	30	0	30
F/A-18 (NAS Oceana Fleet)	184	10	194	138	4	142	160	4	164
F/A-18 (MCAS Cherry Point Fleet)	84	8	92	_		. —	104	8	112
F/A-18 (Other Navy)	237	28	265	237	28	265	237	28	265
F/A-18 (Marine Corps)	202	16	218	212	8	220	210	8	218
AV-8 (Fleet)	226	12	238	214	18	232	260	10	270
AV-8 (FRS)	61	0	61	33	0	33	63	0	63
EA-6B	13	0	13	13	0	13	13	0	13
A-10	134	0	134	108	0	108	146	0	146
F-15	74	8	82	80	4	84	84	2	86
F-16	384	0	384	360	8	368	410	6	416
AH-1	80	0	80	86	0	86	84	o	84
UH-1	29	0	29	31	o	31	32	o	32
CH-46	84	0	84	75	o	75	96	0	96
CH-53	15	0	15	11	0	11	9	2	11
Army Helicopters	82	8	90	82	8	90	92	8	100
Other Jets	43	0	43	37	0	37	37	0	37
Other Props	22	0	22	19	0	19	20	. 0	20
TOTAL	2,216	106	2,322	1,936	82	2,018	2,303	88	2,391



Table B-6: Annual R-5306A Sorties (exclusive of BT-9 and BT-11)

	1	Baseline		1	ARS-1			ARS-2	
				Day			Day	Night	
Atus walk Oaks warm	<b>Day</b> 0700-	Night 2200-	Total	0700-	Night 2200-	Total	0700-	2200-	Total
Aircraft Category		0700	Total	2200	0700	1 Otal	2200	0700	iotai
E/A 40 (840-in-a Co-ra)	2200 91	0700	91	89	0700	89	91	0,00	91
F/A-18 (Marine Corps)	I I	_	1,021	1,039	10	1.049	1.046	8	1.054
AV-8 (Fleet)	1,003	18	1,553	1,552	2	1,554	1,551	2	1,553
AV-8 (FRS)	1,553	0			9	291	279	9	288
EA-6B	279	9	288	282	- 1		31	0	31
A-10	30	0	30	29	0	29	-	- 1	_
F-15	56	0	56	60	0	60	58	0	58
F-16	208	4	212	208	4	212	206	4	210
F-16 (Air National Guard)	26	0	26	26	0	26	26	0	26
AH-1	136	0	136	136	0	136	136	이	136
Other Jets	35	0	35	35	0	35	35	0	35
On let perp								- 1	90
Other Props	90	0	90	90	0	90	90	0	
<del>-</del>		0 31	90 <b>3,538</b>	90 3,546	0 25	90 <b>3,571</b>	3,549	23	3,572
Other Props		31			25			23	
Other Props	3,507	31 ARS-3		3,546	25 ARS-4		3,549	23 ARS-5	
Other Props	3,507 Day	ARS-3 Night	3,538	3,546 Day	25 ARS-4 Night	3,571	3,549 Day	23 ARS-5 Night	3,572
Other Props	3,507 <b>Day</b> 0700-	31 ARS-3 Night 2200-		3,546 <b>Day</b> 0700-	25 ARS-4 Night 2200-		3,549 <b>Day</b> 0700-	23 ARS-5 Night 2200-	
Other Props  TOTAL  Aircraft Category	3,507 <b>Day</b> 0700- 2200	ARS-3 Night	3,538 Total	3,546 <b>Day</b> 0700- 2200	25 ARS-4 Night 2200- 0700	3,571 Total	3,549 <b>Day</b> 0700- 2200	23 ARS-5 Night 2200- 0700	3,572 Total
Other Props TOTAL	3,507 <b>Day</b> 0700-	31 ARS-3 Night 2200-	3,538 Total	3,546 Day 0700- 2200 91	25 ARS-4 Night 2200- 0700	3,571 Total	3,549 <b>Day</b> 0700- 2200 95	23 ARS-5 Night 2200- 0700	3,572 Total
Other Props  TOTAL  Aircraft Category	3,507 <b>Day</b> 0700- 2200	ARS-3 Night 2200- 0700	3,538 Total	3,546 <b>Day</b> 0700- 2200	25 ARS-4 Night 2200- 0700 0 32	3,571 Total 91 1,084	3,549 Day 0700- 2200 95 1,035	23 ARS-5 Night 2200- 0700 0 28	3,572 Total 95 1,063
Other Props  TOTAL  Aircraft Category  F/A-18 (Marine Corps)	3,507 <b>Day</b> 0700- 2200 91	31 ARS-3 Night 2200- 0700	3,538 Total	3,546 Day 0700- 2200 91	25 ARS-4 Night 2200- 0700 0 32 2	3,571 Total 91 1,084 1,554	3,549 Day 0700- 2200 95 1,035 1,554	23 ARS-5 Night 2200- 0700 0 28 0	3,572 Total 95 1,063 1,554
Other Props  TOTAL  Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet)	3,507 <b>Day</b> 0700- 2200 91 1,053	31 ARS-3 Night 2200- 0700 0	3,538 Total 91 1,069	3,546  Day 0700- 2200 91 1,052	25 ARS-4 Night 2200- 0700 0 32	3,571 Total 91 1,084	3,549 Day 0700- 2200 95 1,035 1,554 280	23 ARS-5 Night 2200- 0700 0 28	3,572 Total 95 1,063 1,554 291
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS)	3,507 <b>Day</b> 0700- 2200 91 1,053 1,550	31 ARS-3 Night 2200- 0700 0 16	3,538 Total 91 1,069 1,550	3,546  Day 0700- 2200 91 1,052 1,552	25 ARS-4 Night 2200- 0700 0 32 2	3,571 Total 91 1,084 1,554	3,549 Day 0700- 2200 95 1,035 1,554 280 30	23 ARS-5 Night 2200- 0700 0 28 0	3,572 Total 95 1,063 1,554 291 30
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B	3,507 Day 0700- 2200 91 1,053 1,550 287	31 ARS-3 Night 2200- 0700 0 16 0	3,538  Total  91 1,069 1,550 297	3,546  Day 0700- 2200 91 1,052 1,552 278	25 ARS-4 Night 2200- 0700 0 32 2 10	3,571  Total  91 1,084 1,554 288	3,549 Day 0700- 2200 95 1,035 1,554 280	23 ARS-5 Night 2200- 0700 0 28 0 11	3,572 Total 95 1,063 1,554 291 30 56
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B A-10	3,507 <b>Day</b> 0700- 2200 91 1,053 1,550 287 30	31 ARS-3 Night 2200- 0700 0 16 0 10 0	3,538  Total  91 1,069 1,550 297 30	3,546 Day 0700- 2200 91 1,052 1,552 278 30	25 ARS-4 Night 2200- 0700 0 32 2 10 0	3,571  Total  91 1,084 1,554 288 30	3,549 Day 0700- 2200 95 1,035 1,554 280 30	23 ARS-5 Night 2200- 0700 0 28 0 11 0	3,572 Total 95 1,063 1,554 291 30
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B A-10 F-15	3,507 Day 0700- 2200 91 1,053 1,550 287 30 54	31 ARS-3 Night 2200- 0700 0 16 0 10 0	3,538  Total  91 1,069 1,550 297 30 54	3,546 Day 0700- 2200 91 1,052 1,552 278 30 56	25 ARS-4 Night 2200- 0700 0 32 2 10 0 0	3,571 Total 91 1,084 1,554 288 30 56	3,549 Day 0700- 2200 95 1,035 1,554 280 30 52	23 ARS-5 Night 2200- 0700 0 28 0 11 0 4	3,572 Total 95 1,063 1,554 291 30 56
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B A-10 F-15 F-16	3,507  Day 0700- 2200 91 1,053 1,550 287 30 54 208	31 ARS-3 Night 2200- 0700 0 16 0 10 0 4	3,538  Total  91 1,069 1,550 297 30 54 212	3,546 Day 0700- 2200 91 1,052 1,552 278 30 56 208	25 ARS-4 Night 2200- 0700 0 32 2 10 0 0 4	3,571 Total 91 1,084 1,554 288 30 56 212	3,549 Day 0700- 2200 95 1,035 1,554 280 30 52 202	23 ARS-5 Night 2200- 0700 0 28 0 11 0 4 8	3,572 Total 95 1,063 1,554 291 30 56 210
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B A-10 F-15 F-16 (Air National Guard)	3,507  Day 0700- 2200 91 1,053 1,550 287 30 54 208 26	31 ARS-3 Night 2200- 0700 0 16 0 10 0 4 0	3,538  Total  91 1,069 1,550 297 30 54 212 26	3,546 Day 0700- 2200 91 1,052 1,552 278 30 56 208 26	25 ARS-4 Night 2200- 0700 0 32 2 10 0 0 4	3,571 Total 91 1,084 1,554 288 30 56 212 26	3,549 Day 0700- 2200 95 1,035 1,554 280 30 52 202 26	23 ARS-5 Night 2200- 0700 0 28 0 11 0 4 8 0	3,572  Total  95 1,063 1,554 291 30 56 210 26
Aircraft Category  F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B A-10 F-15 F-16 (Air National Guard) AH-1	3,507  Day 0700- 2200 91 1,053 1,550 287 30 54 208 26 136	31 ARS-3 Night 2200- 0700 0 16 0 10 0 4 0 0	3,538  Total  91 1,069 1,550 297 30 54 212 26 136	3,546 Day 0700- 2200 91 1,052 1,552 278 30 56 208 26 136	25 ARS-4 Night 2200- 0700 0 32 2 10 0 4 0 0	3,571 Total 91 1,084 1,554 288 30 56 212 26 136	3,549 Day 0700- 2200 95 1,035 1,554 280 30 52 202 26 136	23 ARS-5 Night 2200- 0700 0 28 0 11 0 4 8 0 0	3,572  Total  95 1,063 1,554 291 30 56 210 26 136

Table B-7: Annual R-5306D Sorties (MCAS Cherry Point demand only)

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Tota!	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
AV-8 (Fleet)	560	2	562	582	0	582	568	4	572
KC-130 (MCAS Cherry Point Fleet)	22	0	22	22	0	22	22	0	22
KC-130 (MCAS Cherry Point FRS)	34	0	34	34	0	34	34	0	34
TOTAL	616	2	618	638	0	638	624	4	628
		ARS-3	l		ARS-4			ARS-5	
	Day	ARS-3 Night		Day	ARS-4 Night		Day	ARS-5 Night	
Aircraft Category	<b>Day</b> 0700-		Total	<b>Day</b> 0700-		Total	<b>Day</b> 0700-		Total
Aircraft Category		Night	Total		Night	Total	- 1	Night	Total
Aircraft Category  AV-8 (Fleet)	0700-	Night 2200-	Total 580	0700-	Night 2200-	Total	0700-	Night 2200-	Total 588
	0700- 2200	Night 2200- 0700		0700- 2200	Night 2200- 0700		0700- 2200	Night 2200-	
AV-8 (Fleet)	0700- 2200 580	Night 2200- 0700	580	0700- 2200 572	Night 2200- 0700 4	576	0700- 2200 584	Night 2200- 0700 4 0	588



Table B-8: Annual W-72 Sorties (exclusive of W-72 TACTS range)

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
User/Service Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	2,942	58	3,000	4,002	42	4,044	3,809	61	3,87
F-14 (NAS Oceana FRS)	2,739	0	2,739	2,808	0	2,808	2,783	0	2,78
F/A-18 (NAS Oceana Fleet)				5,158	156	5,314	4,286	149	4,435
F/A-18 (MCAS Cherry Point Fleet)	_	-	-	_				-	-
F/A-18 (NAS Oceana FRS)	_	-	-	4,535	61	4,596	4,537	58	4,595
F/A-18 (Marine Corps)	75	0	75	75	0	75	75	0	75
KC-130 (MCAS Cherry Point FRS)	4	o	4	4	0	4	4	0	
Adversary	121	o	121	544	0	544	522	0	522
Navy Other	2,771	204	2,975	2,773	202	2,975	2,769	206	2,97
Air Force Jets	1,323	0	1,323	1,329	0	1,329	1,328	0	1,32
Air Force Other	69	41	110	70	40	110	70	40	110
Coast Guard	46	33	79	46	33	79	46	33	79
Contractor	876	0	876	876	o	876	876	0	876
Civilian	34	37	71	34	37	71	34	37	7
TOTAL	11,000	373	11,373	22,254	571	22,825	21,139	584	21,723
	İ	ARS-3	ı		ARS-4			ARS-5	
	Day	Night		Day	Night		Day	Night	
User/Service Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	3,723	60	3,783	3,536	<b>6</b> 5	3,601	3,588	56	3,64
F-14 (NAS Oceana FRS)	2,757	0	2,757	2,796	0	2,796	2,762	0	2,762
F/A-18 (NAS Oceana Fleet)	3,680	102	3,782	2,810	64	2,874	2,830	83	2,91
F/A-18 (MCAS Cherry Point Fleet)	134	16	150	-	-	_	262	40	30
F/A-18 (NAS Oceana FRS)	4,522	60	4,582	4,518	61	4,579	4,472	76	4,54



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Table B-9: Annual W-386A/B Sorties

		Baseline			ARS-1		ARS-2		
User/Service Category	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total
	2200	0700		2200	0700		2200	0700	00
F-14 (NAS Oceana Fleet)	0	0	0	98	0	98	88	0	88
F-14 (NAS Oceana FRS)	14	0	14	17	0	17	15	0	15
F/A-18 (NAS Oceana Fleet)	1 —		-	276	4	280	206	0	206
F/A-18 (NAS Oceana FRS)		_		22	0	22	18	0	18
F/A-18 (Marine Corps)	15	0	15	15	0	15	15	0	15
Navy Other	360	199	559	362	199	561	363	199	562
Air Force Jets	3,308	0	3,308	3,424	0	3,424	3,452	0	3,452
Air Force Other	75	24	99	75	24	99	75	24	99
Coast Guard	17	2	19	17	2	19	17	2	19
NASA (Missle Launches)	183	0	183	183	0	183	183	0	183
Contractor	7	4	11	. 7	4	11	7	4	11
Civilian	129	27	156	129	27	156	129	27	156
	TAL 4,108	256	4,364	4,625	260	4,885	4,568	256	4,824
	1	450.0		ı	ABC 4		ı	APS.E	

		ARS-3			ARS-4			ARS-5	
User/Service Category	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total
<b>550</b> 1,7 <b>5</b> 010105 5411 <b>5</b> 51,7	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	94	0	94	148	0	148	100	0	100
F-14 (NAS Oceana FRS)	34	0	34	7	0	7	36	0	36
F/A-18 (NAS Oceana Fleet)	206	4	210	86	0	86	150	0	150
F/A-18 (NAS Oceana FRS)	69	0	69	18	0	18	65	0	65
F/A-18 (Marine Corps)	15	0	15	15	0	15	15	0	15
Navy Other	362	198	560	360	199	559	366	199	565
Air Force Jets	3,518	0	3,518	3,442	0	3,442	3,484	0	3,484
Air Force Other	<b>7</b> 5	24	99	75	24	99	75	24	99
Coast Guard	17	2	19	17	2	19	17	2	19
NASA (Missle Launches)	183	0	183	183	0	183	183	0	183
Contractor	7	4	11	7	4	11	7	4	11
Civilian	130	25	155	129	27	156	129	27	156
TOTAL	4,710	257	4,967	4,487	256	4,743	4,627	256	4,883



Table B-10: Annual W-386D Sorties

		Baseline			ARS-1			ARS-2	
User/Service Category	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total	<b>Day</b> 0700-	Night 2200-	Total
	2200	0700		2200	0700		2200	0700	70.0.
F-14 (NAS Oceana Fleet)	275	5	280	325	5	330		0	317
F-14 (NAS Oceana FRS)	684	0	684	684	0	684	684	o	68-
F/A-18 (NAS Oceana Fleet)	_		_	179	0	179	159	o	159
Adversary	0	0	o	О	0	o	0	o	(
Air Force Jets	3	o	3	83	0	83	60	0	60
NASA (Missle Launches)	183	0	183	183	0	183	183	0	183
TOTAL	1,145	5	1,150	1,454	5	1,459	1,403	0	1,403
							' '	•	
		ARS-3			ARS-4		•	ARS-5	
	Day	Night		Day	Night		Day	Night	
User/Service Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	341	0	341	325	4	329	325	0	325
F-14 (NAS Oceana FRS)	684	0	684	684	0	684	684	0	
F/A-18 (NAS Oceana Fleet)									684
1 / 1 / 2 (/ 11 / 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	133	0	133	111	0	111	139	0	
	133	0	133	111	0	111	139 0	0	139
Adversary Air Force Jets	_ 1		133 2 47		- 1		!	0 0 0	684 139 0
Adversary	2	o	2	0	0	0	0	o	139 C

Table B-11: Annual W-122 Sorties

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
User/Service Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
out, out the daily	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	718	44	762	474	56	530	377	56	43
F-14 (NAS Oceana FRS)	123	0	123	104	0	104	108	0	10
F/A-18 (NAS Oceana Fleet)	_	_	_	565	16	581	397	20	41
F/A-18 (MCAS Cherry Point Fleet)	_			_	_	-	_		_
Adversary	О	0	0	0	0	o	0	0	
F/A-18 (Marine Corps)	551	68	619	546	73	619	550	72	62
AV-8 (Fleet)	2,130	32	2,162	2,126	35	2,161	2,129	35	2,16
AV-8 (FRS)	1,316	0	1,316	1,311	0	1,311	1,311	0	1,31
EA-6B	1,606	15	1,621	1,610	15	1,625	1,606	15	1,62
KC-130 (MCAS Cherry Point Fleet)	144	0	144	144	0	144	144	o	14
KC-130 (MCAS Cherry Point FRS)	231	o	231	231	0	231	231	o	23
Navy Other	452	184	636	454	182	636	453	183	63
Air Force Jets	4.852	573	5.425	4.849	580	5,429	4,844	584	5,42
Air Force Other	270	60	330	270	60	330	270	60	33
	40	4	44	40	4	44	40	4	4
Coast Guard Contractor	34	9	43	34	9	43	33	10	4
Contractor	J41	9	- 1	- 1		837	774	63	83
	774	62	2271						
Civilian	774	1.052	837 14 293	774 13 532	1 093				
	774 13,241	1,052	14, <b>293</b>	13,532		14,625		1,102	14,36
Civilian				13,532	1,093 ARS-4		13,267	1,102 ARS-5	
Civilian	13,241 Day	1,052 ARS-3 Night	14,293	13,532 Day	1,093 ARS-4 Night	14,625	13,267 Day	1,102 ARS-5 Night	14,36
Civilian	13,241	1,052 ARS-3		13,532 Day 0700-	1,093 ARS-4 Night 2200-		13,267 Day 0700-	1,102 ARS-5 Night 2200-	
Civilian TOTAL	13,241 Day	1,052 ARS-3 Night	14,293	13,532 <b>Day</b> 0700- 2200	1,093  ARS-4  Night 2200- 0700	14,625 Total	13,267 <b>Day</b> 0700- 2200	1,102 ARS-5 Night 2200- 0700	14,36
Civilian TOTAL	13,241 Day 0700-	1,052 ARS-3 Night 2200-	14,293	13,532 Day 0700- 2200 485	1,093 ARS-4 Night 2200- 0700 30	14,625 Total	13,267 Day 0700- 2200 721	1,102 ARS-5 Night 2200- 0700 40	14,36 Total
Civilian TOTAL User/Service Category	13,241 Day 0700- 2200	1,052 ARS-3 Night 2200- 0700	14,293 Total	13,532 <b>Day</b> 0700- 2200	1,093  ARS-4  Night 2200- 0700  30 0	14,625 Total 515 107	Day 0700- 2200 721 117	1,102 ARS-5 Night 2200- 0700 40 0	14,36 Total 76
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet)	13,241 Day 0700- 2200 553	1,052 ARS-3 Night 2200- 0700 48	14,293 Total	13,532 Day 0700- 2200 485	1,093 ARS-4 Night 2200- 0700 30	14,625 Total	13,267 Day 0700- 2200 721	1,102 ARS-5 Night 2200- 0700 40 0 4	76 11 26
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet)	Day 0700- 2200 553 112	1,052 ARS-3 Night 2200- 0700 48 0	14,293 Total 601 112	13,532 Day 0700- 2200 485 107	1,093  ARS-4  Night 2200- 0700  30 0 4 —	14,625 Total 515 107	Day 0700- 2200 721 117	1,102 ARS-5 Night 2200- 0700 40 0 4 98	76 11 26 2,81
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet)	Day 0700- 2200 553 112 328	1,052 ARS-3 Night 2200- 0700 48 0 12	14,293 Total 601 112 340	13,532 Day 0700- 2200 485 107	1,093  ARS-4  Night 2200- 0700  30 0	Total 515 107 283 — 0	Day 0700- 2200 721 117 257 2,715 70	1,102 ARS-5 Night 2200- 0700 40 0 4 98 0	76 11 26 2,81
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet)	Day 0700- 2200 553 112 328 1,635	1,052 ARS-3 Night 2200- 0700 48 0 12 52	14,293 Total 601 112 340 1,687	Day 0700- 2200 485 107 279	1,093  ARS-4  Night 2200- 0700  30 0 4 —	14,625 Total 515 107 283	Day 0700- 2200 721 117 257 2,715	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74	76 11 26 2,81
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary	Day 0700- 2200 553 112 328 1,635 72	1,052  ARS-3  Night 2200- 0700  48 0 12 52 0	Total 601 112 340 1,687 72	Day 0700- 2200 485 107 279 —	1,093  ARS-4  Night 2200- 0700  30 0 4 — 0	Total 515 107 283 — 0	Day 0700- 2200 721 117 257 2,715 70 543 2,069	1,102 ARS-5 Night 2200- 0700 40 0 4 98 0	766 111 26 2,81 7 61 2,10
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps)	Day 0700- 2200 553 112 328 1,635 72 540	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77	14,293 Total 601 112 340 1,687 72 617	Day 0700- 2200 485 107 279 — 0 548	1,093  ARS-4  Night 2200- 0700  30 0 4 — 0 69	14,625  Total  515 107 283 — 0 617	Day 0700- 2200 721 117 257 2,715 70 543	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0	760 111 260 2,81 7 61 2,10 1,27
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet)	Day 0700- 2200 553 112 328 1,635 72 540 2,054	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38	Total  601 112 340 1,687 72 617 2,092	Day 0700- 2200 485 107 279 — 0 548 2,123	1,093  ARS-4  Night 2200- 0700  30 0 4 0 69 33	14,625  Total  515 107 283 — 0 617 2,156	Day 0700- 2200 721 117 257 2,715 70 543 2,069	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40	76 11 26 2,81 7 61 2,10 1,27
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (FRS)	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0	Total  601 112 340 1,687 72 617 2,092 1,305	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314	1,093  ARS-4  Night 2200- 0700  30 0 4 0 69 33 0	14,625  Total  515 107 283 — 0 617 2,156 1,314	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0	Total  76 11 26 2,81 7 61 2,10 1,27 1,62
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet)	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21	Total  601 112 340 1,687 72 617 2,092 1,305 1,631	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23	761 11 26 2,81 7 61 2,10 1,27 1,62
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16 0	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621 144	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0	76 11 26 2,81
Civilian  TOTAL  User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana FRS) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet) KC-130 (MCAS Cherry Point FRS)	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143 220	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0 0	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143 220	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605 144 231	1,093  ARS-4  Night 2200- 0700  30 0 4 — 0 69 33 0 16 0 0	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621 144 231	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144 226	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0 0	76 11 26 2,81 7 61 2,10 1,27 1,62
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F-18 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet) KC-130 (MCAS Cherry Point FRS) Navy Other	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143 220 460	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0 0 177	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143 220 637	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605 144 231 451	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16 0 0 185	Total  515 107 283 — 0 617 2,156 1,314 1,621 144 231 636	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144 226 454	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0 0 182	76 111 26 2,81 7 61 2,10 1,27 1,62 14 22 63 5,42
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F-18 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet) KC-130 (MCAS Cherry Point FRS) Navy Other Air Force Jets	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143 220 460 4,879	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0 0 177 542	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143 220 637 5,421	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605 144 231 451 4,865	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16 0 0 185 563	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621 144 231 636 5,428	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144 226 454 4,873	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0 0 182 555	761 111 262 2,81 7 61 2,10 1,27 1,62 14 22 63 5,42
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet) KC-130 (MCAS Cherry Point Fleet) Navy Other Air Force Jets Air Force Other	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143 220 460 4,879 269	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0 0 177 542 61	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143 220 637 5,421 330	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605 144 231 451 4,865 270	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16 0 185 563 60 4	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621 144 231 636 5,428 330	Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144 226 454 4,873 270	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0 0 182 555 60	761 11 26 2,81 7 61 2,10 1,27 1,62
User/Service Category  F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F-14 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet) F/A-18 (MCAS Cherry Point Fleet) Adversary F/A-18 (Marine Corps) AV-8 (Fleet) AV-8 (FRS) EA-6B KC-130 (MCAS Cherry Point Fleet) KC-130 (MCAS Cherry Point Fleet) Navy Other Air Force Jets Air Force Other Coast Guard	Day 0700- 2200 553 112 328 1,635 72 540 2,054 1,305 1,610 143 220 460 4,879 269 40	1,052  ARS-3 Night 2200- 0700  48 0 12 52 0 77 38 0 21 0 0 177 542 61 4	14,293 Total 601 112 340 1,687 72 617 2,092 1,305 1,631 143 220 637 5,421 330 44	Day 0700- 2200 485 107 279 — 0 548 2,123 1,314 1,605 144 231 451 4,865 270 40	1,093  ARS-4 Night 2200- 0700  30 0 4 0 69 33 0 16 0 185 563 60 4 9	14,625  Total  515 107 283 — 0 617 2,156 1,314 1,621 144 231 636 5,428 330 44	13,267 Day 0700- 2200 721 117 257 2,715 70 543 2,069 1,276 1,602 144 226 454 4,873 270 40	1,102  ARS-5  Night 2200- 0700  40 0 4 98 0 74 40 0 23 0 0 182 555 60 4	76 11 26 2,81 7 61 2,10 1,27 1,62 14 22 63 5,42



Table B-12: Annual Military Training Route Sorties (NAS Oceana and MCAS Cherry Point demand only)

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
VR-1043									
AV-8 (FRS)	22	o	22	35	. 0	35	24	0	24
		Ĭ		•		•			
VR-1046									
F/A-18 (NAS Oceana Fleet)				350	16	366	308	20	328
AV-8 (Fleet)	210	0	210	196	0	196	182	20	320 184
AV-8 (FRS)	82	0	82	190 85	0			-	
		0	7777.00			85	60	0	60
VR-1046 Total	292		292	631	16	647	550	22	572
VR-1074				'					
AV-8 (Fleet)	250	0	250	246	2	248	260	2	262
AV-8 (FRS)	74	0	74	61	0	61	70	0	70
VR-1074 Total	324	0	324	307	2	309	330	2	332
VR-1753									
F-14 (NAS Oceana Fleet)	200	0	200	194	6	200	184	o	184
F-14 (NAS Oceana FRS)	548	o	548	553	0	553	550	o	550
F/A-18 (NAS Oceana Fleet)	340	٦	340	526	30	í	}	_	
F/A-18 (MCAS Cherry Point Fleet)		_	_	526	30	556	480	22	502
				404			_	_	
F/A-18 (NAS Oceana FRS)				104	40	144	91	50	141
VR-1753 Total	748	0	748	1,377	76	1,453	1,305	72	1,377
VR-073		l				1		İ	
	00				_			_ [	
F-14 (NAS Oceana FRS)	28	0	28	28	0	28	28	0	28
AV-8 (FIRE)	232	4	236	278	6	284	258	4	<b>2</b> 62
AV-8 (FRS)	214	0	214	214	0	214	238	0	238
VR-073 Total	474	4	478	520	6	526	524	4	528
00			ŀ			İ		ļ	
Other Visual Routes					[	l		i	
F-14 (NAS Oceana Fleet)	760	0	760	760	0	760	774	0	774
F/A-18 (NAS Oceana FRS)			_	350	0	350	350	0	350
F/A-18 (MCAS Cherry Point Fleet)	-				-	_			_
AV-8 (Fleet)	160	2	162	124	2	126	146	4	150
AV-8 (FRS)	61	0	61	57	ol	57	62	0	62
EA-6B	495	0	495	495	o	495	495	o	495
KC-130 (MCAS Cherry Point Fleet)	18	o	18	18	o	18	18	o	18
KC-130 (MCAS Cherry Point FRS)	174	o	174	174	ő	174	174	0	174
Other Visual Routes Total	1,668	2	1,670	1,978	2	1,980	2,019	4	2,023
The stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the stock of the s	.,555		1,070	1,570		1,500	2,019	4	2,023
Other Instrument Routes	1					]			
F/A-18 (NAS Oceana FRS)					_			_	
177 10 (1470 Oceana FRO)	-	-	-	110	5	115	115	5	120
TOTAL ALL DOUTES	0.500								
TOTAL ALL ROUTES	3,528	6	3,534	4,958	107	5,065	4,867	109	4,976



Table B-12 (cont.): Annual Military Training Route Sorties (NAS Oceana and MCAS Cherry Point demand only)

		ARS-3			ARS-4			ARS-5	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
All Clair Category	2200	0700	, ,	2200	0700		2200	0700	
VR-1043									
AV-8 (FRS)	23	0	23	21	0	21	23	0	23
A									
VR-1046						ا ـ ـ ـ ا	400		100
F/A-18 (NAS Oceana Fleet)	272	8	280	184	2	186	190	2	192
AV-8 (Fleet)	186	0	186	180	4	184	168	4	172
AV-8 (FRS)	85	0	85	87	0	87	75	0	75
VR-1046 Total	543	8	551	451	6	457	433	6	439
VR-1074	240	4	244	250	o	250	284	14	298
AV-8 (Fleet)		0	73	67	0	67	77	0	77
AV-8 (FRS)	73 313	4	317	317	0	317	361	14	375
VR-1074 Total	313		317	3,7					
VR-1753									
F-14 (NAS Oceana Fleet)	198	2	200	190	2	192	202	0	202
F-14 (NAS Oceana FRS)	551	0	551	552	0	552	551	0	551
F/A-18 (NAS Oceana Fleet)	408	8	416	332	10	342	326	8	334
F/A-18 (MCAS Cherry Point Fleet)	0	o	l o			_	0	0	0
F/A-18 (NAS Oceana FRS)	88	53	141	101	41	142	96	45	141
VR-1753 Total		63	1,308	1,175	53	1,228	1,175	53	1,228
VR-073			28	28	0	28	28	. 0	28
F-14 (NAS Oceana FRS)	28	0		288 288	1	302	250	2	252
AV-8 (Fleet)	288	4	292		•	223	225	0	225
AV-8 (FRS)	221	0	221	223		553	503		505
VR-073 Tota	537	4	541	539	14	333	303		303
Other Visual Routes		1							
F-14 (NAS Oceana Fleet)	760	o	760	766	0	766	756	0	756
F/A-18 (NAS Oceana FRS)	350	0	350	350	0	350	350	0	350
F/A-18 (MCAS Cherry Point Fleet)	132	2	134				296	16	312
AV-8 (Fleet)	128	4	132		2	126	128	4	132
AV-8 (FRS)	50	o	50		ł	54	52	0	52
EA-6B	494	0	494	l .	i	1	495	0	495
KC-130 (MCAS Cherry Point Fleet)	18		18	18	0	18	18	0	18
KC-130 (MCAS Cherry Point FRS)	174	1		i .			l .	0	174
Other Visual Routes Tota	-					1,983	2,269	20	2,289
Other Instrument Routes						·			
F/A-18 (NAS Oceana FRS)	105	9	114	112	2 7	119	110	4	114
TOTAL ALL ROUTES	4,872	94	4,966	4,596	82	4,678	4,874	99	4,973



Table B-13: Annual Fort Pickett Range Sorties (NAS Oceana and MCAS Cherry Point demand only)

		Baseline			ARS-1			ARS-2	
	Day	Night		Day	Night		Day	Night	
Aircraft Category	0700-	2200-	Total	0700-	2200-	Total	0700-	2200-	Total
	2200	0700		2200	0700		2200	0700	
F-14 (NAS Oceana Fleet)	72	0	72	116	Ö	116	102	0	102
F/A-18 (NAS Oceana Fleet)	-	_	_	92	4	96	62	4	66
F/A-18 (MCAS Cherry Point Fleet)	_	_		_			_		_
TOTAI	- 72	0	72	208	4	212	164	4	168
TOTAI	-  72  	O ARS-3	72	208	4  ARS-4	212	164	4 ARS-5	168
TOTAI	. 72 Day		72	208 Day	1	212	164 Day	'	168
TOTAI		ARS-3	72	•	ARS-4	212		ARS-5	168
144.84	Day	ARS-3	,,	Day	ARS-4		Day	ARS-5	168 Total
144.84	<b>Day</b> 0700-	ARS-3 Night 2200-	,,	<b>Day</b> 0700-	ARS-4 Night 2200-		<b>Day</b> 0700- 2200	ARS-5 Night 2200-	
Aircraft Category	<b>Day</b> 0700-2200	ARS-3 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-4 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-5 Night 2200- 0700	Total
Aircraft Category F-14 (NAS Oceana Fleet)	<b>Day</b> 0700- 2200	ARS-3 Night 2200- 0700	Total 98	<b>Day</b> 0700- 2200 142	ARS-4 Night 2200- 0700	Total	<b>Day</b> 0700- 2200	ARS-5 Night 2200- 0700	Total

Table B-14: Annual Stumpy Point Range Sorties (NAS Oceana demand only)

			Baseline			ARS-1			ARS-2	
Aircraft Category		<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total
F-14 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet)		50 —	6	56 —	26 8	0	26 8	24 12	0	24 12
	TOTAL	50	6	56	34	0	34	36	o	36
			ARS-3			ARS-4			ARS-5	
Aircraft Category		<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total	<b>Day</b> 0700- 2200	Night 2200- 0700	Total
F-14 (NAS Oceana Fleet) F/A-18 (NAS Oceana Fleet)		20 8	0 0	20 8	44 12	2 0	46 12	20 4	0	20 4
	TOTAL	28	0	28	56	2	58	24	0	24



## **B.2** Exclusive-Use Training Area Utilization

This section provides utilization statistics for the four primary exclusive-use training areas in the study: W-72 TACTS range, Navy Dare, BT-11, and BT-9. Each of these areas requires users to reserve blocks of area/range time. These tables quantify the number of Scheduled Hours and Used Hours. The Scheduled Hours and Used Hours data are presented in daytime (daylight needed for mission) and nighttime (darkness needed for mission) categories.

In order to better observe the impact of Navy squadrons and other military units on these areas, hours are allocated to the User/Service Group that schedules the time block. For events that consist of joint training between NAS Oceana- or MCAS Cherry point-based units and other units (e.g., Navy F-14 and Air Force Jets), the hours are allocated to the Navy members of the event (e.g., Navy F-14). For events that consist of joint training between one or more NAS Oceana- or MCAS Cherry point-based Navy units (e.g., Navy F-14 and Navy F/A-18), the hours are divided evenly among the Navy participants. Consequently, the hours allocated to non-Navy units consist of area/range time during which the non-Navy units perform training without the involvement of NAS Oceana- or MCAS Cherry Point squadrons.

The W-72 TACTS range utilization statistics includes time scheduled for activities requiring the TACTS range instrumentation and for activities using the area only.

Four summary statistics for each area are presented in the following tables and are defined as follows:

normal operating hours (see Section 2.4).

Non-Overtime Scheduled Hours The range hours scheduled during the

normal operating hours.

Published Hours The annual number of hours the range is

available according to the published

(normal) operating hours.

Percentage Utilization The percentage of published range hours

scheduled (Non-Overtime Scheduled

Hours/Published Hours).



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Table B-15: Annual TACTS Range Utilization (Baseline Scenario)

User/Sevice	Sc	heduled Ho	urs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	1,659.5	114.0	1,773.5	1,628.5	112.5	1,741.0
F-14 (NAS Oceana FRS)	378.0	0.0	378.0	344.5	0.0	344.5
Adversary	100.5	0.0	100.5	85.0	0.0	85.0
Air Force Jets	29.0	0.0	29.0	23.5	0.0	23.5
TOTAL	2,167.0	114.0	2,281.0	2,081.5	112.5	2,194.0
Overtime Hours			151.5			
Non-Overtime Scheduled Hours			2,129.5			
Published Hours			2,730.0			
Percentage Utilization			78%			

Table B-16: Annual TACTS Range Utilization (ARS-1)

User/Sevice	Sc	heduled Ho	ırs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	840.0	36.0	876.0	827.5	34.5	862.0
F-14 (NAS Oceana FRS)	329.0	0.0	329.0	285.5	0.0	285.5
F/A-18 (NAS Oceana Fleet)	1,214.0	0.0	1,214.0	1,197.5	0.0	1,197.5
F/A-18 (NAS Oceana FRS)	70.5	0.0	70.5	60.0	0.0	60.0
Adversary	64.0	0.0	64.0	58.0	0.0	58.0
Air Force Jets	33.5	0.0	33.5	31.5	0.0	31.5
TOTAL	2,551.0	36.0	2,587.0	2,460.0	34.5	2,494.5
Overtime Hours			310.5			
Non-Overtime Scheduled Hours			2,276.5			
Published Hours			2,730.0			
Percentage Utilization			83%			

Table B-17: Annual TACTS Range Utilization (ARS-2)

User/Sevice	Sc	heduled Hou	ırs		<b>Used Hours</b>	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	893.5	43.5	937.0	868.0	40.5	908.5
F-14 (NAS Oceana FRS)	330.5	0.0	330.5	286.0	0.0	286.0
F/A-18 (NAS Oceana Fleet)	1,043.0	0.0	1,043.0	1,025.5	0.0	1,025.5
F/A-18 (NAS Oceana FRS)	78.0	0.0	78.0	70.5	0.0	70.5
Adversary	67.0	0.0	67.0	61.0	0.0	61.0
Air Force Jets	36.5	0.0	36.5	35.5	0.0	
TOTAL	2,448.5	43.5	2,492.0	2,346.5	40.5	2,387.0
Overtime Hours			294.5		•	
Non-Overtime Scheduled Hours			2,197.5			
Published Hours			2,730.0			
Percentage Utilization			80%			



Table B-18: Annual TACTS Range Utilization (ARS-3)

User/Sevice	Sc	heduled Hou	irs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	826.5	40.5	867.0	814.0	39.0	853.0
F-14 (NAS Oceana FRS)	332.0	0.0	332.0	285.0	0.0	285.0
F/A-18 (NAS Oceana Fleet)	861.0	0.0	861.0	850.0	0.0	850.0
F/A-18 (MCAS Cherry Point Fleet)	195.0	0.0	195.0	195.0	0.0	195.0
F/A-18 (NAS Oceana FRS)	60.0	0.0	60.0	49.5	0.0	49.5
Adversary	58.0	0.0	58.0	55.0	0.0	55.0
Air Force Jets	37.5	0.0	37.5	37.0	0.0	37.0
TOTAL	2,370.0	40.5	2,410.5	2,285.5	39.0	2,324.5
Overtime Hours			319.5			
Non-Overtime Scheduled Hours			2,091.0			
Published Hours			2,730.0			
Percentage Utilization			77%			

Table B-19: Annual TACTS Range Utilization (ARS-4)

User/Sevice	Sc	heduled Hou	irs		<b>Used Hours</b>	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	920.0	45.0	965.0	902.0	45.0	947.0
F-14 (NAS Oceana FRS)	323.5	0.0	323.5	285.0	0.0	285.0
F/A-18 (NAS Oceana Fleet)	827.5	0.0	827.5	808.0	0.0	808.0
F/A-18 (NAS Oceana FRS)	85.5	0.0	85.5	73.5	0.0	73.5
Adversary	74.0	0.0	74.0	66.0	0.0	66.0
Air Force Jets	31.0	0.0	31.0	31.0	0.0	31.0
TOTAL	2,261.5	45.0	2,306.5	2,165.5	45.0	2,210.5
Overtime Hours			238.5			
Non-Overtime Scheduled Hours			2,068.0			
Published Hours			2,730.0			
Percentage Utilization			76%			

Table B-20: Annual TACTS Range Utilization (ARS-5)

User/Sevice	Sc	heduled Ho	urs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
F-14 (NAS Oceana Fleet)	753.0	37.5	790.5	735.5	36.0	771.5
F-14 (NAS Oceana FRS)	330.5	0.0	330.5	289.0	0.0	289.0
F/A-18 (NAS Oceana Fleet)	831.5	0.0	831.5	818.0	0.0	818.0
F/A-18 (MCAS Cherry Point Fleet)	239.5	0.0	239.5	239.0	0.0	239.0
F/A-18 (NAS Oceana FRS)	69.0	0.0	69.0	66.0	0.0	66.0
Adversary	68.0	0.0	<b>6</b> 8.0	63.0	0.0	63.0
Air Force Jets	36.0	0.0	36.0	35.5	0.0	35.5
TOTAL	2,327.5	37.5	2,365.0	2,246.0	36.0	2,282.0
Overtime Hours			301.0		·	
Non-Overtime Scheduled Hours			2,064.0			
Published Hours			2,730.0			
Percentage Utilization			76%			



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Table B-21: Annual Navy Dare Utilization (Baseline Scenario)

User/Sevice	Scheduled Hours			Used Hours			
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total	
Navy Total	1,798.3	193.3	1,991.5	1,535.5	169.3	1,704.8	
F-14 (NAS Oceana Fleet)	1,198.0	193.3	1,391.3	998.0	169.3	1,167.3	
F-14 (NAS Oceana FRS)	574.0	0.0	574.0	512.0	0.0	512.0	
Adversary	9.0	0.0	9.0	9.0	0.0	9.0	
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5	
Marine Corps Total	15.3	14.3	29.5	15.3	13.5	28.8	
AV-8 (Fleet)	7.5	9.8	17.3	7.5	9.8	17.3	
AV-8 (FRS)	3.0	0.8	3.8	3.0	0.8	3.8	
F/A-18	4.8	3.8	8.5	4.8	. 3.0	7.8	
Air Force Total	218.0	27.0	245.0	184.3	21.8	206.0	
F-15	35.3	9.0	44.3	30.5	7.0	37.5	
F-16	85.8	1.8	87.5	69.8	1.8	71.5	
F-16 (Air National Guard)	94.5	15.0	109.5	81.5	12.5	94.0	
A-10	2.5	1.3	3.8	2.5	0.5	3.0	
TOTAL	2,031.5	234.5	2,266.0	1,735.0	204.5	1,939.5	
Overtime Hours			0.0				
Non-Overtime Scheduled Hours			2,266.0				
Published Hours			4,000.0				
Percentage Utilization			57%				

Table B-22: Annual Navy Dare Utilization (ARS-1)

User/Sevice	Sc	Scheduled Hours			Used Hours			
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total		
Navy Total	2,050.8	401.5	2,452.3	1,760.0	342.5	2,102.5		
F-14 (NAS Oceana Fleet)	1,038.6	169.4	1,208.0	886.5	142.4	1,028.9		
F-14 (NAS Oceana FRS)	555.3		555.3	481.0	0.0	481.0		
F/A-18 (NAS Oceana Fleet)	324.9	118.1	443.0	276.3	101.9	378.1		
F/A-18 (NAS Oceana FRS)	93.0	114.0	207.0	79.5	98.3	177.8		
Adversary	21.8	0.0	21.8	20.3	0.0	20.3		
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5		
Marine Corps Total	11.0	10.5	21.5	11.0	10.5	21.5		
AV-8 (Fleet)	5.3	8.3	13.5	5.3	8.3	13.5		
AV-8 (FRS)	2.3	0.0	2.3	2.3	0.0	2.3		
F/A-18	3.5	2.3	5.8	3.5	2.3			
Air Force Total	195.0	24.3	219.3	169.3	21.5	190.8		
F-15	23.3	7.5	30.8	19.5	6.3	25.8		
F-16	74.5	1.8	76.3	65.0	1.8			
F-16 (Air National Guard)	95.5	13.5	109.0	83.0	12.0			
A-10	1.8	1.5	3.3	1.8	1.5	3.3		
TOTAL	2,256.8	436.3	2,693.0	1,940.3	374.5	2,314.8		
Overtime Hours			18.0					
Non Overtime Scheduled Hours		2,675.0						
Published Hours			4,000.0					
Percentage Utilization			67%					



Table B-23: Annual Navy Dare Utilization (ARS-2)

User/Sevice	Sc	heduled Ho	urs		Used Hours	Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total		
Navy Total	2,032.3	378,3	2,410.5	1,734.5	328.8	2,063.3		
F-14 (NAS Oceana Fleet)	1,023.4	164.5	1,187.9	866.3	143.5	1,009.8		
F-14 (NAS Oceana FRS)	569.0	0.0	569.0	490.8	0.0	490.8		
F/A-18 (NAS Oceana Fleet)	305.6	101.0	406.6	262.0	87.8	349.8		
F/A-18 (NAS Oceana FRS)	96.8	112.8	209.5	81.0	97.5	178.5		
Adversary	20.3	0.0	20.3	18.0	0.0	18.0		
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5		
Marine Corps Total	9.3	9.0	18.3	9.3	9.0	18.3		
AV-8 (Fleet)	3.8	6.8	10.5	3.8	6.8	10.5		
AV-8 (FRS)	2.3	0.8	3.0	2.3	0.8	3.0		
F/A-18	3.3	1.5	4.8	3.3	1.5	4.8		
Air Force Total	199.8	30.8	230.5	168.0	27.3	195.3		
F-15	26.8	11.8	38.5	21.0	11.3	32.3		
F-16	74.3	3.3	77.5	61.3	3.3	64.5		
F-16 (Air National Guard)	95.5	14.5	110.0	82.5	11.5	94.0		
A-10 `	3.3	1.3	4.5	3.3	1.3	4.5		
TOTAL	2,241.3	418.0	2,659.3	1,911.8	365.0	2,276.8		
Overtime Hours			19.8					
Non-Overtime Scheduled Hours			2,639.5					
Published Hours			4,000.0					
Percentage Utilization			66%	_				

Table B-24: Annual Navy Dare Utilization (ARS-3)

User/Sevice	Sc	heduled Ho	ırs		Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total	
Navy Total	2,025.3	367.3	2,392.5	1,742.0	321.0	2,063.0	
F-14 (NAS Oceana Fleet)	1,054.6	154.5	1,209.1	903.6	135.8	1,039.4	
F-14 (NAS Oceana FRS)	566.8	0.0	566.8	500.0	0.0	500.0	
F/A-18 (NAS Oceana Fleet)	251.0	92.0	343.0	209.6	80.3	289.9	
F/A-18 (MCAS Cherry Point Fleet)	8.9	7.5	16.4	8.8	7.5	16.3	
F/A-18 (NAS Oceana FRS)	102.0	113.3	215.3	81.0	97.5	178.5	
Adversary	24.8	0.0	24.8	22.5	0.0	22.5	
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5	
Marine Corps Total	16.0	10.8	26.8	16.0	10.0	26.0	
AV-8 (Fleet)	6.8	9.0	15.8	6.8	9.0	15.8	
AV-8 (FRS)	4.5	0.0	4.5	4.5	0.0	4.5	
F/A-18	4.8	1.8	6.5	4.8	1.0	5.8	
Air Force Total	206.8	24.3	231.0	174.3	21.3	195.5	
F-15	26.5	6.5	33.0	19.8	5.5	25.3	
F-16	77.3	2.8	80.0	66.0	2.8	68.8	
F-16 (Air National Guard)	103.0	13.5	116.5	88.5	11.5	100.0	
A-10	0.0	1.5	1.5	0.0	1.5	1.5	
TOM	2,248.0	402.3	2,650.3	1,932.3	352.3	2,284.5	
Overtime Hours	Overtime Hours						
Non-Overtime Scheduled Hours	Non-Overtime Scheduled Hours						
Published Hours			4,000.0				
Percentage Utilization			66%				



Table B-25: Annual Navy Dare Utilization (ARS-4)

User/Sevice	Sc	heduled Hou	ırs		Used Hours	;
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	1,946.3	347.5	2,293.8	1,669.0	299.8	1,968.8
F-14 (NAS Oceana Fleet)	1,098.0	173.8	1,271.8	924.3	147.1	1,071.4
F-14 (NAS Oceana FRS)	557.5	0.0	557.5	492.3	0.0	492.3
F/A-18 (NAS Oceana Fleet)	158.8	61.5	220.3	140.8	54.6	195.4
F/A-18 (NAS Oceana FRS)	98.3	112.3	210.5	79.5	98.0	177.5
Adversary	16.5	0.0	16.5	15.8	0.0	15.8
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5
Marine Corps Total	15.3	17.5	32.8	15.3	17.5	32.8
AV-8 (Fleet)	7.5	11.3	18.8	7.5	11.3	18.8
AV-8 (FRS)	3.0	2.3	5.3	3.0	2.3	5.3
F/A-18	4.8	4.0	8.8	4.8	4.0	8.8
Air Force Total	209.5	24.3	233.8	180.3	20.8	201.0
F-15	29.5	7.8	37.3	25.3	6.8	32.0
F-16	77.8	2.5	80.3	67.3	2.5	69.8
F-16 (Air National Guard)	99.5	13.5	113.0	85.0	11.0	96.0
A-10	2.8	0.5	3.3	2.8	0.5	3.3
TOTAL	2,171.0	389.3	2,560.3	1,864.5	338.0	2,202.5
Overtime Hours			18.5			. "
Non-Overtime Scheduled Hours			2,541.8			
Published Hours			4,000.0			
Percentage Utilization			64%			

Table B-26: Annual Navy Dare Utilization (ARS-5)

User/Sevice	Scheduled Hours			Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	1,983.0	367.3	2,350.3	1,721.5	322.0	2,043.5
F-14 (NAS Oceana Fleet)	1,074.0	157.9	1,231.9	920.1	137.9	1,058.0
F-14 (NAS Oceana FRS)	553.0	0.0	553.0	493.0	0.0	493.0
F/A-18 (NAS Oceana Fleet)	176.3	68.0	244.3	154.3	61.5	215.8
F/A-18 (MCAS Cherry Point Fleet)	41.8	25.9	67.6	41.6	25.9	67.5
F/A-18 (NAS Oceana FRS)	100.5	115.5	216.0	79.5	96.8	176.3
Adversary	20.3	0.0	20.3	16.5	0.0	16.5
Navy Exercise	17.3	0.0	17.3	16.5	0.0	16.5
Marine Corps Total	12.8	10.0	22.8	12.8	10.0	22.8
AV-8 (Fleet)	5.3	7.5	12.8	5.3	7.5	12.8
AV-8 (FRS)	3.8	0.8	4.5	3.8	0.8	4.5
F/A-18	3.8	1.8	5.5	3.8	1.8	5.5
Air Force Total	210.3	28.0	238.3	182.8	22.5	205.3
F-15	31.8	8.0	39.8	27.8	6.8	34.5
F-16	71.0	3.3	74.3	62.0	2.5	64.5
F-16 (Air National Guard)	105.5	16.0	121.5	91.0	12.5	103.5
A-10	2.0	0.8	2.8	2.0	8.0	2.8
TOTAL	2,206.0	405.3	2,611.3	1,917.0	354.5	2,271.5
Overtime Hours			22.8			
Non-Overtime Scheduled Hours			2,588.5			
Published Hours			4,000.0			
Percentage Utilization			65%			



Table B-27: Annual BT-11 Utilization (Baseline Scenario)

User/Sevice	Scheduled Hours			Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	189.7	42.0	231.7	155.3	St. 1 10 10 1	190.0
F-14 (NAS Oceana Fleet)	133.3	3.3	136.7	105.0		108.3
Navy Exercise	56.3	38.7	95.0	50.3	31.3	81.7
Marine Corps Total	640.3	123.0	763.3	621.3	a transfer and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the	742.0
AV-8 (Fleet)	177.3	94.0	271.3	177.3		271.3
AV-8 (FRS)	223.3	8.0	231.3	223.3		231.3
F/A-18	98.3	17.7	116.0	89.3		105.3
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0		24.0
AH-1	40.7	0.0	40.7	36.7		36.7
CH-46	56.0	0.0	56.0	51.3		51.3
CH-53	1.3	3.3	4.7	1.3		4.0
UH-1	19.3	0.0	19.3	18.0	0.0	18.0
Air Force Total	276.7	36.7	313.3	243.3	Notes your proposition of a contract	
F-15	108.0	27.3	135.3	96.0		118.0
F-16	91.3	0.7	92.0	78.0		78.7
F-16 (Air National Guard)	52.7	2.0	54.7	46.7		h .
A-10	24.7	6.7	31.3	22.7	5.3	28.0
Army Total	31.0	4.0	35.0	30.0	::::::::::::::::::::::::::::::::::::	**************************************
Army Helicopters	31.0	4.0	35.0	30.0	4.0	34.0
Other Total	55.7	2.3	58.0	52.0		
Other Jets	24.3	2.3	26.7	20.7	2.3	
Other Props	31.3	0.0	31.3	31.3	0.0	31.3
TOTAL	1,193.3	208.0	1,401.3	1,102.0	191.0	1,293.0
Overtime Hours			40.3			
Non-Overtime Scheduled Hours			1,361.0			
Published Hours			3,350.0			
Percentage Utilization			42%			



Table B-28: Annual BT-11 Utilization (ARS-1)

User/Sevice Schedule			urs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	476.3	110.0	"at " " " " and hall " to a committee of	409.0	96.3	505.3
F-14 (NAS Oceana Fleet)	139.7	8.7	148.3	115.3	8.0	123.3
F/A-18 (NAS Oceana Fleet)	283.3	66.3	349.7	243.3	57.0	300.3
Navy Exercise	53.3	35.0	88.3	50.3	31.3	81.7
Marine Corps Total	601.7	125.3	727.0	580.7	122.0	702.7
AV-8 (Fleet)	162.3	99.7	262.0	162.3	99.7	262.0
AV-8 (FRS)	210.0	8.7	218.7	210.0	8.7	218.7
F/A-18	97.3	14.3	111.7	86.3	11.7	98.0
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0	0.0	24.0
AH-1	37.3	0.0	37.3	33.3	0.0	33.3
CH-46	50.0	0.0	50.0	45.3	0.0	45.3
CH-53	1.3	2.7	4.0	1.3	2.0	3.3
UH-1	19.3	0.0	19.3	18.0	0.0	18.0
Air Force Total	276.7	35.3	312.0	246.7	32.0	278.7
F-15	110.0	26.0	136.0	99.3	23.3	122.7
F-16	90.0	2.7	92.7	77.3	2.7	80.0
F-16 (Air National Guard)	51.3	2.7	54.0	46.7	2.7	49.3
A-10	25.3	4.0	29.3	23.3	3.3	26.7
Army Total	31.0	1.0	32.0	30.0	1.0	31.0
Army Helicopters	31.0	1.0	32.0	30.0	1.0	31.0
Other Total	55.0	2.3	57.3	54.0	2.3	56.3
Other Jets	23.0	2.3	25.3	22.0	2.3	24.3
Other Props	32.0	0.0	32.0	32.0	0.0	32.0
TOTAL	1,440.7	274.0	1,714.7	1,320.3	253.7	1,574.0
Overtime Hours			51.7			
Non-Overtime Scheduled Hours			1,663.0			
Published Hours			3,350.0			
Percentage Utilization			51%			

Table B-29: Annual BT-11 Utilization (ARS-2)

User/Sevice	Scl	heduled Hou	ırs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	449.7	98.3	548.0	390.7		480.7
F-14 (NAS Oceana Fleet)	148.0	10.7	158.7	126.0	9.7	135.7
F/A-18 (NAS Oceana Fleet)	248.3	54.0	302.3	214.3	49.0	263.3
Navy Exercise	53.3	33.7	87.0	50.3	31.3	81.7
Marine Corps Total	609.0	124.0	733.0	589.7	to a manager of the product of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of the base of	709.3
AV-8 (Fleet)	162.7	95.3	258.0	162.7	95.3	258.0
AV-8 (FRS)	215.0	7.3	222.3	215.0	7.3	222.3
F/A-18	96.7	18.7	115.3	88.0	15.0	103.0
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0		24.0
AH-1	40.0		40.0	35.3		35.3
CH-46	51.3		51.3	46.7		46.7
CH-53	1.3	2.7	4.0	1.3	2.0	3.3
UH-1	18.0	0.0	18.0	16.7	0.0	16.7
Air Force Total	280.7	32.7	313.3	248.7		279.3
F-15	110.0	23.3	133.3	98.0		120.0
F-16	94.7		96.0	81.3		82.7
F-16 (Air National Guard)	52.0		54.7	47.3		50.0
A-10	24.0	5.3	29.3	22.0	4.7	26.7
Army Total	31.0	1.0	32.0	30.0	MARKET COLUMN	31.0
Army Helicopters	31.0	1.0	32.0	30.0	1.0	31.0
Other Total	57.7	4.7	62.3	54.7	4.7	59.3
Other Jets	26.7	4.7	31.3	23.7		28.3
Other Props	31.0	0.0	31.0	31.0	0.0	31.0
TOTAL	1,428.0	260.7	1,688.7	1,313.7	246.0	1,559.7
Overtime Hours			46.3			
Non-Overtime Scheduled Hours			1,642.3			
Published Hours			3,350.0			
Percentage Utilization			49%			



Table B-30: Annual BT-11 Utilization (ARS-3)

User/Sevice	Scl	neduled Ho	urs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	486.7	109.7	596.3	442.3		539.7
F-14 (NAS Oceana Fleet)	128.0	7.0	135.0	112.0	6.7	118.7
F/A-18 (NAS Oceana Fleet)	201.7	48.0	249.7	177.0	39.7	216.7
F/A-18 (MCAS Cherry Point Fleet)	103.7	19.7	123.3	103.0	19.7	122.7
Navy Exercise	53.3	35.0	88.3	50.3	31.3	81.7
Marine Corps Total	601.0	117.7	718.7	578.0	114.7	692.7
AV-8 (Fleet)	158.7	91.3	250.0	158.7	91.3	250.0
AV-8 (FRS)	206.7	8.7	215.3	206.7	8.7	215.3
F/A-18	99.7	15.7	115.3	86.7	13.3	100.0
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0	0.0	24.0
AH-1	40.0	0.0	40.0	36.0	0.0	36.0
CH-46	51.3	0.0	51.3	46.7	0.0	46.7
CH-53	1.3	2.0	3.3	1.3	1.3	2.7
UH-1	19.3	0.0	19.3	18.0	0.0	18.0
Air Force Total	267.3	36.0	303.3	242.7	34.7	277.3
F-15	109.3	26.7	136.0	102.0	26.0	128.0
F-16	90.0	1.3	91.3	80.7	1.3	82.0
F-16 (Air National Guard)	46.0	3.3	49.3	40.7	2.7	43.3
A-10	22.0	4.7	26.7	19.3	4.7	24.0
Army Total	31.0	2.0	33.0	30.0	2.0	32.0
Army Helicopters	31.0	2.0	33.0	30.0	2.0	32.0
Other Total	46.7	3.3	50.0	45.7	7 : : . 2.7	48.3
Other Jets	21.7	3.3	25.0	20.7	2.7	23.3
Other Props	25.0	0.0	25.0	25.0	0.0	25.0
TOTAL	1,432.7	268.7	1.701.3	1,338.7	251.3	1,590.0
Overtime Hours			45.0			
Non-Overtime Scheduled Hours		!	1,656.3			·
Published Hours			3,350.0			
Percentage Utilization			49%			



Table B-31: Annual BT-11 Utilization (ARS-4)

User/Sevice Scheduled Hour						1
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	362.3	70.0	432.3	310.7		374.3
F-14 (NAS Oceana Fleet)	141.7	5.0	146.7	118.7	4.7	123.3
F/A-18 (NAS Oceana Fleet)	167.3	30.0	197.3	141.7	27.7	169.3
Navy Exercise	53.3	35.0	88.3	50.3	31.3	81.7
Marine Corps Total	621.0	122.0	743.0	602.3	Name of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control o	720.7
AV-8 (Fleet)	168.7	94.0	262.7	168.7		262.7
AV-8 (FRS)	220.3	7.3	227.7		7.3	227.7
F/A-18	93.3	17.3	110.7		14.3	98.3
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0		24.0
AH-1	38.0	0.0	38.0			34.0
CH-46	56.7	0.0	56.7	52.7		52.7
CH-53	1.3	3.3	4.7	1.3		4.0
UH-1	18.7	0.0	18.7	17.3	0.0	17.3
Air Force Total	269.3	37,3	306.7	236.7	32.7	269.3
F-15	94.0	25.3	119.3	84.0	22.0	106.0
F-16	93.3	0.7	94.0	80.0	0.7	80.7
F-16 (Air National Guard)	56.0	5.3	61.3	49.3	4.7	54.0
A-10	26.0		32.0	23.3	5.3	28.7
Army Total	31.0	2.0	33.0	30.0	2.0	
Army Helicopters	31.0	2.0	33.0	30.0	2.0	32.0
Other Total	55.3	2.7	58.0	54.3	4.734.7	A CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH
Other Jets	24.3	2.7	27.0			1
Other Props	31.0	0.0	31.0	31.0	0.0	31.0
TOTAL COLOR	1,339.0	234.0	1,573,0	1,234.0	218.3	1,452.3
Overtime Hours			43.0			
Non-Overtime Scheduled Hours			1,530.0	1		
Published Hours			3,350.0	<del>-1</del>		
Percentage Utilization			46%			



Table B-32: Annual BT-11 Utilization (ARS-5)

User/Sevice	Sc	heduled Ho	urs	Used Hours			
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total	
Navy Total	553.7	107.3	661.0	506.7	97.7	604.3	
F-14 (NAS Oceana Fleet)	122.7	8.0	130.7	103.3	7.3	110.7	
F/A-18 (NAS Oceana Fleet)	161.0	29.3	190.3	137.3	24.7	162.0	
F/A-18 (MCAS Cherry Point Fleet)	217.0		252.0	216.0	34.3	250.3	
Navy Exercise	53.0	35.0	88.0	50.0	31.3	81.3	
Marine Corps Total	588.7	124.3	713.0	572.0	121.0	693.0	
AV-8 (Fleet)	155.7	96.7	252.3	155.7	96.7	252.3	
AV-8 (FRS)	212.0	8.0	220.0	212.0	8.0	220.0	
F/A-18	92.3	16.3	108.7	85.0	13.7	98.7	
KC-130 (MCAS Cherry Point Fleet)	24.0	0.0	24.0	24.0	0.0	24.0	
AH-1	38.7	0.0	38.7	34.7	0.0	34.7	
CH-46	46.7	0.0	46.7	42.7	0.0	42.7	
CH-53	1.3	3.3	4.7	1.3	2.7	4.0	
UH-1	18.0	0.0	18.0	16.7	0.0	16.7	
Air Force Total	252.7		279.3	228.7	23.3	252.0	
F-15	98.0	20.7	<del>1</del> 18.7	89.3	18.7	108.0	
F-16	92.7		93.3	82.0	0.7	82.7	
F-16 (Air National Guard)	43.3	1.3	44.7	39.3	1.3	40.7	
A-10	18.7	4.0	22.7	18.0	2.7	20.7	
Army Total	29.0	1.0	30.0	28.0	1.0	29.0	
Army Helicopters	29.0	1.0	30.0	28.0	1.0	29.0	
Other Total	53.7	2.7	56.3	52.7	2.7	55.3	
Other Jets	24.3	2.7	27.0	23.3	2.7	26.0	
Other Props	29.3	0.0	29.3	29.3	0.0	29.3	
TOTAL	1,477.7	262.0	1,739.7	1,388.0	245.7	1,633.7	
Overtime Hours			45.0				
Non-Overtime Scheduled Hours			1,694.7				
Published Hours			3,350.0				
Percentage Utilization			51%				



Table B-33: Annual BT-9 Utilization (Baseline Scenario)

User/Sevice	So	Scheduled Hours			Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total	
Navy Total	70.3	38.7	109.0	61.7	The Property of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of	93.0	
F-14 (NAS Oceana Fleet)	14.0	0.0	14.0	11.3		11.3	
Navy Exercise	56.3	38.7	95.0	50.3	31.3	81.7	
Marine Corps Total	203.7	30.0	233.7	181.3		210.3	
AV-8 (Fleet)	41.3	20.3	61.7	41.3		61.7	
AV-8 (FRS)	8.0	0.0	8.0	8.0		8.0	
F/A-18	70.3	8.0	78.3	58.0		65.0	
AH-1	30.7	0.0	30.7	26.0		26.0	
CH-46	37.3	0.0	37.3	32.7		32.7	
CH-53	1.3	1.7	3.0	1.3		3.0	
UH-1	14.7	0.0	14.7	14.0	0.0	14.0	
Air Force Total	119.3	14.0	133.3	106.0	13.3	119.3	
F-15	8.7	6.0	14.7	8.0		14.0	
F-16	84.7	4.7	89.3	75.3		80.0	
A-10	26.0	3.3	29.3	22.7	2.7	25.3	
Army Total	8.0	1.0	9.0	7.0	1.0	8.0	
Army Helicopters	8.0	1.0	9.0	7.0	1.0	8.0	
Other Total	59.3	12.3	71.7	-49.7	(1	Printed and the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of th	
Other Jets	18.0	12.3	30.3	17.3		27.7	
Other Props	41.3	0.0	41.3	32.3	0.0	32.3	
TOTAL	460.7	96.0	556.7	405.7	85.0	490.7	
Overtime Hours			40.3				
Non-Overtime Scheduled Hours			516.3				
Published Hours			3,350.0				
Percentage Utilization			17%				



Table B-34: Annual BT-9 Utilization (ARS-1)

User/Sevice	Sc	heduled Ho	urs	Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	131.3	48.3	179.7	113.7	43.3	100
F-14 (NAS Oceana Fleet)	31.3	6.0	37.3	25.3		
F/A-18 (NAS Oceana Fleet)	46.7	7.3	54.0	38.0		44.7
Navy Exercise	53.3	35.0	88.3	50.3	31.3	81.7
Marine Corps Total	233.3	32.0	265.3	214.3	31.0	245.3
AV-8 (Fleet)	49.0	18.0	67.0	49.0	18.0	67.0
AV-8 (FRS)	19.3	0.0	19.3	19.3	0.0	19.3
F/A-18	71.7	11.7	83.3	62.0	10.7	72.7
AH-1	34.0	0.0	34.0	30.0	0.0	30.0
CH-46	43.3	0.0	43.3	38.7	0.0	38.7
CH-53	1.3	2.3	3.7	1.3	2.3	3.7
UH-1	14.7	0.0	14.7	14.0	0.0	14.0
Air Force Total	140.0	14.0	154.0	123.3	11.3	134.7
F-15	17.3	7.3	24.7	16.0	6.7	22.7
F-16	94.7	3.3	98.0	82.7	2.0	84.7
A-10	28.0	3.3	31.3	24.7	2.7	27.3
Army Total	8.0	3.0	11.0	7.0	3.0	10.0
Army Helicopters	8.0	3.0	11.0	7.0	3.0	10.0
Other Total	56.0	11.3	67.3	46.3	10.3	56.7
Other Jets	15.3	11.3	26.7	14.7	10.3	25.0
Other Props	40.7	0.0	40.7	31.7	0.0	31.7
TOTAL	568.7	108.7	677.3	504.7	99.0	603.7
Overtime Hours			51.7			
Non-Overtime Scheduled Hours			625.7			
Published Hours			3,350.0			
Percentage Utilization			20%			



Table B-35: Annual BT-9 Utilization (ARS-2)

User/Sevice	Sc	Scheduled Hours			Used Hours		
Group	Daytime	Nighttime	Tota!	Daytime	Nighttime	Total	
Navy Total	112.0	46.3	158.3	96.3	42.0	138.3	
F-14 (NAS Oceana Fleet)	26.3	5.3	31.7	21.3	4.3	25.7	
F/A-18 (NAS Oceana Fleet)	32.3	7.3	39.7	24.7	6.3	31.0	
Navy Exercise	53.3	33.7	87.0	50.3	31.3	81.7	
Marine Corps Total	216.3	40.3	256.7	200.3	the control of the control of the	240.3	
AV-8 (Fleet)	44.7	28.3	73.0	44.7	28.3	73.0	
AV-8 (FRS)	15.3	0.0	15.3	15.3	0.0	15.3	
F/A-18	66.3	9.7	76.0	58.3	9.3	67.7	
AH-1	31.3		31.3	28.0	0.0	28.0	
CH-46	41.3		41.3	37.3	0.0	37.3	
CH-53	1.3	2.3	3.7	1.3		3.7	
UH-1	16.0	0.0	16.0	15.3	0.0	15.3	
Air Force Total	136.0	10.7	146.7	121.3		129.3	
F-15	16.0		21.3	15.3		19.3	
F-16	93.3	2.7	96.0	82.7	2.0	84.7	
A-10	26.7	2.7	29.3	23.3	2.0	25.3	
Army Total	8.0	3.0	11.0	7.0		10.0	
Army Helicopters	8.0	3.0	11.0	7.0	3.0	10.0	
Other Total	56.7	9.8	66.0	46.3	7.7	54.0	
Other Jets	18.0	9.3	27.3			24.3	
Other Props	38.7	0.0	38.7	29.7	0.0	29.7	
TOTAL	529.0	109.7	638.7	471.3	100.7	572.0	
Overtime Hours	46.3						
Non-Overtime Scheduled Hou	592.3						
Published Hours	3,350.0						
Percentage Utilization		:	18%				



Table B-36: Annual BT-9 Utilization (ARS-3)

User/Sevice	Sc	Scheduled Hours			Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total	
Navy Total	115.7	46.3	162.0	106.0	42.0	148.0	
F-14 (NAS Oceana Fleet)	26.3	4.3	30.7	22.3	4.0	26.3	
F/A-18 (NAS Oceana Fleet)	24.3	5.0	29.3	22.3	4.7	27.0	
F/A-18 (MCAS Cherry Point Fleet)	11.7	2.0	13.7	11.0	2.0	13.0	
Navy Exercise	53.3	35.0	88.3	50.3	31.3	81.7	
Marine Corps Total	214.7	32.7	247.3	199.3	30.7	230.0	
AV-8 (Fleet)	42.0	16.3	58.3	42.0	16.3	58.3	
AV-8 (FRS)	19.3	0.0	19.3	19.3	0.0	19.3	
F/A-18	64.0	13.3	77.3	58.0	11.3	69.3	
AH-1	32.7	0.0	32.7	27.3	0.0	27.3	
CH-46	40.0	0.0	40.0	37.3	0.0	37.3	
CH-53	1.3	3.0	4.3	1.3	3.0	4.3	
UH-1	15.3	0.0	15.3	14.0	0.0	14.0	
Air Force Total	148.7	15.3	164.0	125.3	12.0	137.3	
F-15	24.7	8.7	33.3	16.7	7.3	24.0	
F-16	93.3	4.0	97.3	80.0	2.7	82.7	
A-10	30.7	2.7	33.3	28.7	2.0	30.7	
Army Total	8.0	2.0	10.0	7.0	2.0	9.0	
Army Helicopters	8.0	2.0	10.0	7.0	2.0	9.0	
Other Total	62.3	11.3	73.7	52.0	10.3	62.3	
Other Jets	18.7	11.3	30.0	17.3	10.3	27.7	
Other Props	43.7	0.0	43.7	34.7	0.0	34.7	
TOTAL	549.3	107.7	657.0	489.7	97.0	586.7	
Overtime Hours			45.0	,	······································	name in marketin annihiti in 1991.	
Non-Overtime Scheduled Hours			612.0				
Published Hours	······································		3,350.0				
Percentage Utilization			18%				



Table B-37: Annual BT-9 Utilization (ARS-4)

User/Sevice	Sc	heduled Hou	ırs		Used Hours	
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	87.0	38.3	125.3	80.0	34.0	114.0
F-14 (NAS Oceana Fleet)	19.3	1.7	21.0	17.3	1.3	18.7
F/A-18 (NAS Oceana Fleet)	14.7	1.7	16.3	12.7	1.3	14.0
Navy Exercise	53.0	35.0	88.0	50.0	31.3	81.3
Marine Corps Total	202.7		231.0	185.3	28.0	213.3
AV-8 (Fleet)	36.7		55.0	36.7	18.3	55.0
AV-8 (FRS)	12.0	1	12.0	12.0	0.0	12.0
F/A-18	69.3		77.0	61.3	7.3	68.7
AH-1	30.7		30.7	26.7	0.0	26.7
CH-46	37.3		37.3	33.3	0.0	33.3
CH-53	1.3		3.7	1.3	2.3	3.7
UH-1	15.3	0.0	15.3	14.0	0.0	14.0
Air Force Total	138.0		154.0	122.0		134.7
F-15	16.7		23.3	15.3		21.3
F-16	94.0		98.0	82.0		85.3
A-10	27.3	5.3	32.7	24.7	3.3	28.0
Army Total	8.0		11.0	7,0	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	10.0
Army Helicopters	8.0	3.0	11.0	7.0	3.0	10.0
Other Total	55.7	m-f		46.0		56.3
Other Jets	14.3		26.7	13.7	10.3	24.0
Other Props	41.3	0.0	41.3	32.3	0.0	32.3
TOTAL	491.3	98.0	589.3	440.3	88.0	528.3
Overtime Hours	43.0					
Non-Overtime Scheduled Hou	546.3					
Published Hours	3,350.0					
Percentage Utilization			16%			

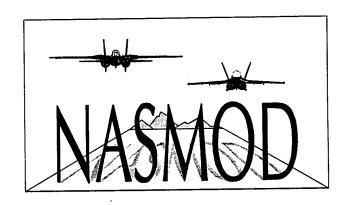


Table B-38: Annual BT-9 Utilization (ARS-5)

User/Sevice	Sc	heduled Ho	urs	Used Hours		
Group	Daytime	Nighttime	Total	Daytime	Nighttime	Total
Navy Total	111.7	46.3	158.0	102.0	41.3	143.3
F-14 (NAS Oceana Fleet)	22.3	4.7	27.0	19.0	4.0	23.0
F/A-18 (NAS Oceana Fleet)	25.3	2.0	27.3	23.0	2.0	25.0
F/A-18 (MCAS Cherry Point Fleet)	11.0	4.7	15.7	10.0	4.0	14.0
Navy Exercise	53.0	35.0	88.0	50.0	31.3	81.3
Marine Corps Total	230.3	33.0	263.3	211.7	31.3	243.0
AV-8 (Fleet)	44.3	19.0	63.3	44.3	19.0	63.3
AV-8 (FRS)	20.0	0.0	20.0	20.0	0.0	20.0
F/A-18	70.0	12.3	82.3	60.7	10.7	71.3
AH-1	32.7	0.0	32.7	28.7	0.0	28.7
CH-46	46.0	0.0	46.0	41.3	0.0	41.3
CH-53	1.3	1.7	3.0	1.3	1.7	3.0
UH-1	16.0	0.0	16.0	15.3	0.0	15.3
Air Force Total	146.7	18.7	165.3	128.7	15.3	144.0
F-15	18.7	7.3	26.0	16.0	6.0	22.0
F-16	96.0	4.0	100.0	84.7	4.0	88.7
A-10	32.0	7.3	39.3	28.0	5.3	33.3
Army Total	9.0	3.0	12.0	8.0	3.0	11.0
Army Helicopters	9.0	3.0	12.0	8.0	3.0	11.0
Other Total	57.3	12.0	69.3	47.0	10.0	57.0
Other Jets	16.0	12.0	28.0	14.7	10.0	24.7
Other Props	41.3	0.0	41.3	32.3	0.0	32.3
TOTAL	555.0	113.0	668.0	497.3	101.0	598.3
Overtime Hours	45.0					
Non-Overtime Scheduled Hours		623.0				
Published Hours	,		3,350.0			
Percentage Utilization			19%			

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APPENDIX C: DISCUSSION OF NAVY F/A-18 SQUADRON ASSIGNMENTS TO CARRIER AIRWINGS

# APPENDIX C: DISCUSSION OF NAVY F/A-18 SQUADRON ASSIGNMENTS TO CARRIER AIRWINGS

The relationship between the year "snapshot" of all airwing workup cycles and the squadron assignment mix in each airwing is very important in determining the local impact of squadron operations. For example, in the case of MCAS Cherry Point, the more F/A-18 fleet squadrons performing FCLPs in the weeks prior to deployment, the more potential there is for competition for airfield pattern slots and thus for inability of other squadrons to perform routine return-to-base pattern work. Similarly, competition for schedule periods at Navy Dare County Range will be keener, and hence, off-load to BT-11 will be greater, if several squadrons from multiple airwings are attempting to perform required air-to-ground work at the same time.

The objective for EIS purposes, therefore, is to come up with a deployment schedule and airwing assignments (i.e., how many squadrons of each type are assigned to each airwing) that will result in a representative, or *average* year of operations. Several constants are assumed given in determining squadron airwing assignments. First, the stagger between airwing deployment dates is fixed. Second, the lengths of deployments and workup periods are set at a nominal six months and 18 months, respectively. Finally, the F-14 squadron airwing assignments are based upon those made in the previous NAS Oceana study and are static for this analysis.

Working within the limitations of using the simulation of a particular year to represent an average year of future operations, analysts determined that it was necessary to adjust the squadron airwing assignments for each unique base loading scenario in order to maintain the goal of providing an average year of operations.

The task at hand reduces down to determining the working definition of "average impact" and then making F/A-18 squadron airwing assignments accordingly. A squadron impacts training area operations and airfield operations, both on the ground and in the pattern and route structures. Certain portions of a squadron's workup cycle are more intense in one particular type of training than the others, such as FCLPs or air-to-ground missions. Therefore, a definition of average impact on the system should not be biased toward or away from a particular period in the workup cycle nor a particular type of mission.

An appropriate measure of the overall impact is annual local sorties conducted by an aircraft group, which in this case is either NAS Oceana-based or MCAS Cherry Point-based Navy F/A-18 fleet squadrons. The squadron average over one year is defined by summing the local sorties over a complete, 24-month workup-deployment cycle and dividing by two. The average impact (local sorties) at a specific air station for the Navy F/A-18 fleet squadrons equals the number of based squadrons multiplied by the overall squadron average.

The first action to achieve an average impact of F/A-18 squadrons at NAS Oceana is to design a year period that captures a normal flow of squadron exercises,

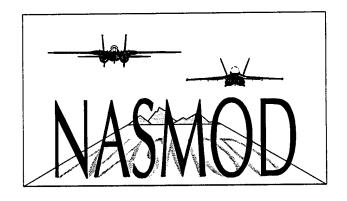


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detachments, and deployments. Then, for each alternative loading scenario, the wing assignments chosen (see Table 2-6 in Section 2.5.1.6) reflect the best possible configuration at NAS Oceana and MCAS Cherry Point to achieve an *estimated* average impact of Navy F/A-18 fleet squadrons. This was a process of calculation, compromise, and judgment on the part of analysts in making airwing assignments to achieve a balance across all types of activities (i.e., air-to-air, FCLP, air-to-ground, total airfield operations) at both NAS Oceana and MCAS Cherry Point. It was not feasible to include MCAS Beaufort in this "averaging" process.

Another, more accurate approach would be to run the simulation for a full two-year period so all airwings would go through a complete cycle and take the average year as half the two-year results. With this approach, each squadron will theoretically conduct the same number and mix of flights, and the shuffling of wing assignments would not be necessary. Technical limitations of the current NASMOD system, however, prevented taking this approach at this time. Nevertheless, with this understanding, the results reported here are a fair picture of a representative year of operations at the studied air stations and training areas.





APPENDIX D: NASMOD OVERVIEW

# APPENDIX D: NASMOD OVERVIEW

The Department of the Navy has developed a simulation model for use in analyzing problems and issues related to airfield and special use airspace operations. The Navy Aviation Simulation Model (NASMOD) provides the Department of the Navy with the capability to conduct simulation analyses that:

- 1. Quantitatively assess airfield and airspace capacity in support of proposed operational alternatives.
- 2. Calculate the impacts of changes in special use airspace on both military and civilian operations.
- 3. Analyze the operational impacts of interaction between military and civilian aircraft.
- 4. Analyze pilot training system resource requirements including airfields, airspace, instructors, syllabus, aircraft type, maintenance, fuel, and operating costs.
- 5. Analyze the impacts of using alternative aircraft types to meet training and operational objectives.

NASMOD merges the capabilities of the Federal Aviation Administration's (FAA) SIMMOD model with enhancements to the Navy's Naval Aviation Training System (NATS) model developed in 1986. SIMMOD, an advanced state-of-the-art model that simulates both airfield and airspace traffic operations, has been used extensively by the FAA in studies and analyses aimed at planning for operational changes in the National Airspace System. The model has proven to be extremely valuable as a tool for analyzing airport and airspace problems, identifying potential solutions, and quantitatively assessing the delay, capacity, traffic loading, and operating cost impacts of potential operational alternatives. Recently, the Navy and the FAA incorporated several key improvements into SIMMOD, including the capability to model dynamic runway plan changes and touch-and-go, FCLP, and GCA operations.

SIMMOD was designed to address enroute or IFR traffic. The Navy's NATS model was developed to address VFR traffic in the training environment. NASMOD combines these capabilities and includes other features necessary to model military aviation operations, such as special ground operations (hover and taxi to ordnance loading areas, high power run-up areas, and hot refueling pits) and the unique vertical and short takeoff and landing (V/STOL) characteristics and operating procedures of the AV-8B aircraft. The new capabilities introduced in NASMOD permit analysis of all Navy and Marine Corps aviation training operations—in the training command, in the fleet replacement squadrons, in the fleet and operating squadrons—and management and utilization of special use airspace areas.

Thus, NASMOD provides the Navy with a tool to evaluate a wide array of proposed special use airspace alternatives and training requirements, the capability



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to quantify impacts on other users of the National Airspace System (commercial and general aviation), and the ability to work with the FAA to mutually resolve critical special use airspace issues. In addition, the Navy now has the capability to evaluate various base closure and realignment alternatives by addressing impacts of airfield and airspace capacity, training requirements, and operational alternatives.

The NASMOD system has three primary components:

- 1. A Graphical User Interface. The Graphical User Interface facilitates data entry and management. NASMOD operates on a SUN workstation in the UNIX operating system. The user interface is window-based and mouse-driven. The system provides tools for building the airfield and airspace network, including routes and runways, for building the profiles of training missions that are used to complete Navy training requirements or syllabus objectives, for entering flight schedule data from the Official Airline Guides (OAG), for digitizing airfield and airspace charts, and for editing the database.
- 2. A Simulation Processor. The simulation processor simulates mission scheduling and operations, based on user input. Users may simulate multiple day periods. There are three major components of the simulation processor that are executed for each simulated day:
  - a. The <u>Scheduler</u>, which selects the missions to be performed each simulated day and devises a conflict-free schedule of missions for that day. This component simulates scheduling performed by squadrons and by airspace and range scheduling authorities, such as a fleet area control and scheduling facility (FACSFAC).
  - b. The <u>Operations and Traffic Simulator</u>, which simulates the day's flight and mission operations, including the utilization of special use airspace areas and interactions between civilian and military traffic.
  - c. The <u>Performance Calculator</u>, which computes detailed and summary measures of daily squadron, airfield, and airspace operations and utilization performance, based on simulated results of the Scheduler and the Operations and Traffic Simulator.
- 3. Results Analysis Tools. NASMOD includes all of SIMMOD's tabular and graphical report generation capabilities, including a flight animation that visually replays simulated aircraft movements on the ground and through the airspace. NASMOD also provides database query tools to assist the analyst in extracting information from the system's output database and setting up reports.

This appendix discusses the Simulation Processor, focusing on the Scheduler and the Operations and Traffic Simulator, and includes an example of the graphical animation capabilities is in the form of computer display snapshots with corresponding descriptions.



#### **D.1 Simulation Processor**

The Simulation Processor components work in tandem: the Scheduler processes the inputs to derive a mission schedule, which serves as input for the Operations and Traffic Simulator. Typically, analysts use NASMOD to study military operations for a multiple-day period, such as one year. A one-year simulation period provides results that account for seasonal variations in activity and the impacts of airwing deployment schedules. During a multiple-day simulation period, the Scheduler considers the dynamic output of the previous day from the Operations and Traffic Simulator in addition to the static database inputs.

#### D.1.1 The Scheduler

NASMOD's Scheduler generates the schedule of missions that is the input for the Operations and Traffic Simulator. Based on the input data, the schedule of missions reflects squadrons' requirements and preferences, as well as airspace limits. In fact, the Scheduler is a two-step process. During the first step, the Scheduler determines the events squadrons desire to perform, and devises a schedule to accomplish those events; during this step NASMOD's Scheduler performs the functions of a squadron scheduler. During the second step, the Scheduler considers all squadrons' schedules and the resulting requests for airspace, and resolves any conflicts; during this step, NASMOD's Scheduler performs the functions of a scheduling authority or central scheduler.

## D.1.1.1 Squadron Scheduler

A squadron has a set of events that it is required to perform; those events must be performed at a certain frequency. The frequency at which those events are performed may vary, depending on the squadron's deployment cycle. On each simulated date, the Scheduler computes the average number of each event that the squadron must do. Next, the Scheduler selects a target number of the event to schedule; that target number reflects the amount performed on previous days. When a squadron has not performed a certain event for several days, it builds a backlog in that event; as a result, on subsequent days the target number of that event increases.

For each event the Scheduler targets for scheduling, it selects a profile that completes that event. The profile contains the sequence of requests the mission makes. A profile may contain several paths—several different sets of requests that the mission might make. Each set might request different activity areas, for example. The Scheduler selects one path, which contains one set of requests. Based on the selected path and the expected transit times, the Scheduler projects a mission length.

Every profile is associated with a range of starting times—times at which missions may begin performing the profile. In addition, a squadron has a specific number of aircraft available and a maximum rate at which it launches those aircraft, such as



ten per hour. The Scheduler attempts to schedule all targeted events, subject to the limits imposed by the launch rate, aircraft availability, mission lengths, and profile starting times.

The resulting schedule represents the missions the squadron would like to accomplish that day, subject to internal aircraft availability and launch rate constraints but with no consideration to requests made by other squadrons or to airspace constraints.

#### D.1.1.2 Central Scheduler

During this second step of the scheduling process, the Scheduler resolves conflicts for airspace usage. As a result of the squadron scheduling process, multiple missions may be scheduled to use the same airspace simultaneously; in fact, the number of missions scheduled to use an airspace may exceed capacity or safety limits that airspace operators impose. To resolve these conflicts, the Scheduler ranks all missions, scheduling higher-priority missions first. (Users may create any number of mission ranks in terms of several criteria, including event, aircraft type, and days until deployment.) When the Scheduler determines that the squadrons are requesting that more missions use an airspace or other activity area than are permitted at any one time, it attempts to reschedule the surplus missions. First, the Scheduler attempts to schedule such a mission at that same activity area at a later time. If that is not possible, the Scheduler attempts to schedule the mission along a different path in its profile, if any are specified. If the mission cannot be scheduled at a later time or at an alternate area, the Scheduler cancels the mission; that event is added to the squadron's backlog, increasing the likelihood that the event will be scheduled on a subsequent day.

The resulting schedule becomes the input for the Operations and Traffic Simulator. Note that this schedule created by the central scheduling process may violate squadron launch requirements or aircraft availability. These violations, variations in travel time, and the interactive effects of non-centrally scheduled missions can lead to simulated activity area usage that differs from scheduled usage.

# **D.1.1.3 Other Capabilities**

In addition to the basic two-step algorithm for scheduling missions, the Scheduler offers users many capabilities to influence the schedule. When devising the squadrons preferred scheduled, the Scheduler considers many special types of events. For instance, the Scheduler can schedule detachments on pre-specified dates or on dates when the squadron's backlog reaches a pre-determined level. The events during a detachment may be pre-specified or determined by the Scheduler. In addition to detachments, the Scheduler may schedule multiple-day events that possibly occur away from the squadron's home base, such as events performed during cross-country missions. The Scheduler may also limit the dates on which events are performed. For example, the Scheduler might schedule carrier



qualification missions only during the two-week period prior to the date on which a carrier is available.

Similarly, during the central scheduling process, the Scheduler considers various types of area usage. Missions may request the area for exclusive use, in which case only missions with which it is coordinated are permitted in the area, or missions may request the area for co-use, in which case either a pre-specified number of aircraft is permitted in the area or a pre-specified volume of the area may be used. (The scheduler permits missions to act as an equivalent number of aircraft, which may differ from the actual number of aircraft; a two-plane Formation flight, for instance, may act as one aircraft.) The Scheduler can also require that certain squadrons use areas during pre-specified time periods, even blocking other squadrons from using the area during those periods.

Finally, the Scheduler determines the sunrise and sunset times, and selects the weather conditions for each activity area on the simulated day. The Scheduler calculates the sunrise and sunset times based on the area's latitude and longitude and the day of the year. The Scheduler selects the weather intensities for each of the three weather types, based on the probabilistic data input by NASMOD analysts. Specifically, analysts enter the probability that each weather condition occurs at an area throughout the day during various seasons of the year.

# **D.1.2 The Operations and Traffic Simulator**

NASMOD's Operations and Traffic Simulator (Simulator) is an extension of the SIMMOD simulation program; NASMOD includes additional capabilities to reflect military operations.

SIMMOD (and hence NASMOD) is a fast-time, Monte-Carlo computer simulation model. Users create operational scenarios, including a node-link network that represents the airfield structure and the airspace route system, and a flight schedule. The model tracks movements of individual aircraft traveling through the node-link network. As it tracks aircraft, the model detects potential violations of separation standards, flow constraints, or operating procedures, and takes air traffic control actions to resolve these potential conflicts and to ensure that all procedural rules are met. The model maintains various statistics relating to travel and delay times, airspace sector occupancy levels, and airport usage. See the SIMMOD Version 2.0 Reference Manual for further discussion of the logic and structure of flight simulation in SIMMOD.

NASMOD adds capabilities to monitor the usage and availability of scarce resources — such as aircraft, instructors, and TACTS pods—and activity areas—such as military operating areas and special use airspace. To make use of these features, NASMOD introduces the concept of a "mission." Missions can fly routes, can acquire and prepare a specific number of a scarce resources, and can use a certain volume of an activity area for a specific amount of time. While flying a route, a mission is called a "flight;" thus, a mission may be composed of a



D-5

sequence of flights. Missions are scheduled in the model by NASMOD's Scheduler. Some flights are pre-defined outside the model in the database (e.g., to represent commercial traffic). The Simulator then "plays out" each day's schedule of missions and flights.

During the simulation, missions make requests. There are four types of requests:

- 1. Requests to obtain or release scarce or tangible resources, such as aircraft, instructors, or TACTS pods. A mission requests a specific number of units, and takes a certain amount of time to prepare the resource units once they are acquired (or the mission takes a certain amount of time to return the resource units and prepare them for the next mission).
- 2. Requests to use an activity area, such as a military operating area, warning area, target range, or fuel pit. A mission requests a specific volume of airspace (or other unit of capacity) in the activity area and uses that volume for a certain amount of time. The volume and the amount of time are dependent upon the activity conducted. The maneuvers associated with a FAM activity, for instance, may take longer than those associated with a FORM activity.
- 3. Requests to fly an airspace route. The model handles the mission as a flight on an airspace route. The mission's flight interacts with other flights, which may also be missions, and the model imposes appropriate air traffic control actions.
- 4. Requests to taxi between two ground activity areas, such as a fuel pit and a pad. The model creates a special ground movement "flight" when a mission wishes to taxi between two ground nodes at a modeled airfield. The mission interacts with other aircraft taxiing at the airfield.

Any of these requests may be coordinated. At coordinated requests, two or more missions join to complete the request together. A coordinated airspace route request, for example, can represent a section flight. The sequence of requests that a mission makes is pre-defined in its mission profile.

The Simulator monitors each mission's progress as it proceeds through its mission profile, taking corrective action as necessary. At requests for tangible resources, for example, the Simulator checks that the resource is available before allowing the mission to acquire and prepare the resource; missions will be delayed in a queue if there is not enough available. Similarly, although the Scheduler devises a schedule that should avoid airspace conflicts, delayed and unscheduled missions may impose unexpected demand for airspace resources; thus, missions might be forced to wait for entry into an activity area.

Furthermore, the Simulator evaluates several constraints at each profile step. These constraints include accumulated mission delay (representing remaining fuel reserve), the amount of daylight remaining (if daylight is required for a mission activity), equipment failure, and weather conditions that affect the ability of the mission to be completed. When a constraint is violated the mission aborts its current request. For some violated constraints, the mission may enter permanent abort mode, in which case it makes no new requests to acquire resources or use



activity areas. Alternatively, a particular step can specify an abort profile; missions in abort mode transition to the abort profile and execute that profile's sequence of requests.

For example, NASMOD allows users to specify three weather types. A weather condition is modeled as a distinct intensity of each of the three weather types. At each mission profile step requesting a resource or activity, the mission checks the current intensities of each weather type; if the current intensity of any one weather type exceeds the mission's threshold intensity for that type, the mission aborts the request. Because each mission may have a unique profile, with different weather threshold intensities, users can easily create one or more missions that are more weather sensitive than other missions.

Thus, by combining resource and activity requests that are constrained in various ways and by using abort profiles, analysts can use NASMOD to model a variety of scenarios, including simple training missions or complex fleet training exercises with alternative return-to-base maneuvers.

For example, NASMOD is fully capable of modeling an AV-8B rolling vertical landing and hot refueling. During such a landing, the aircraft approaches the runway at a slower-than-normal speed, requiring greater separation with following aircraft than during a regular landing. A NASMOD analyst would separate that landing flight into two flight segment requests: during the initial segment the mission acts as a regular aircraft, and during the final approach segment, the mission acts as a special aircraft type that has longer runway occupancy times and for which the model imposes greater separations with other aircraft. After the landing, the aircraft taxis to the ground activity area associated with the fuel pit, where it requests another activity representing refueling. Following completion of that activity, the mission makes a request to taxi to a pad, another ground activity area, where it departs to perform further activities.

The Operations and Traffic Simulator produces several output files. One of these contains step-by-step information about the execution of each mission. Figure D-1 shows a hypothetical mission profile that might be produced by the Scheduler and read by the Simulator. During the simulation, each step in the profile, or each mission request, is executed sequentially. Table D-1 translates that mission profile, explaining how the series of steps might correspond to an actual military training mission.



```
VFA-1.FAM_PROF
                     #17
1
  01 0 0 0 MOA.WXCHECK.NAS NONE 0 0 0 20 0 0
2
  01 1 0 0 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
  00 26 ? ? NAS 0 -1080 0
                                NAS_MOA_V
   01 100 2940 3240 MOA NONE 3240 -1080 0 0 20 0 0
  00 15 ? ? XXX 0 -1080 0
                                MOA_NAS_INI_V
   01 0 0 NASFCLPPAT_RES ABORT_NASRTGPAT_1TNG_PROF
      0 -1080 0 1 50 0 0
  01 1 0 0 NASLTGPAT_RES ABORT_NASRTGPAT_1TNG_PROF
      0 -1080 0 99 50 0
                                NAS_INI_LBRK
   00 53 ? ? XXX 0 -1080 0
   01 10 0 0 NASLTGPAT NONE 0 -600 0 0
      50 0 0
10 00 20 ? ? XXX 0 -600 0
                              NAS_LBRK_NASLTGPAT
11 01 -1 0 0 NASLTGPAT_RES NONE 0 -1080 0 0 50 0 0
12 00 24 ? ? NAS 0 -1080 0
                                NASLTGPAT_LAND
13 01 -1 4800 4800 VFA-1.AIRCRAFT.FA18.NAS NONE 0 -1080 0 0
```

Figure D-1: Sample Profile

Table D-1: Profile Description

Profile Step	Step Description
1	Check weather at activity area; if the weather exceeds a specified intensity (20), cancel the mission.
2	Request a F/A-18 aircraft from squadron VFA-1. If none is immediately available, wait up to 1080 seconds (18 minutes), and then cancel the mission.
3	Fly the route NAS_MOA_V from NAS to MOA.
4	Perform an activity at the MOA that requires 100 volume units. The activity takes between 2940 and 3240 seconds (49 to 54 minutes). Before commencing the activity, check the amount of daylight remaining; if there is not at least 54 minutes of day remaining, do not perform the activity (go to the next profile step). If the area is not immediately available, wait up to 18 minutes for it to become available, and then go to the next profile step. If the weather intensity at the activity area exceeds 20, do not perform the activity; instead, go to the next profile step.
5	Fly the route MOA_NAS_INI_V from the MOA to the initial point at NAS.
6	Check the pattern for FCLPs. If FCLPs are being conducted, go ("abort") to the right pattern to do touch-and-go landings.
7	Try to enter the left touch-and-go pattern. If full, abort to the right pattern to do touch-and-go landings.
8	Fly the route NAS_INI_LBRK from the initial through the left break.
9	Request the touch-and-go activity.
10	Fly the route NAS_LBRK_NASLTGPAT from the break through the first replication of the pattern.
11	Check out of the pattern, allowing others to enter.
12	Fly the route NASLTGPAT_LAND, which brings the aircraft to a full-stop landing.
13	Return the F/A-18 aircraft to VFA-1. Take 80 minutes to do maintenance on the aircraft before returning it to service for other missions to use.



#### **D.1.3 The Performance Calculator**

The data files generated by the Operations and Traffic Simulator are in a highly detailed yet "raw" format. The Performance Calculator processes these files to produce an extensive database with tables that summarize travel actions (both on the ground and in the air), area usage, resource usage, and squadron satisfaction of training requirements. This database can subsequently be searched using formal database querying techniques in order to extract the desired results. Further data processing is generally required in order to render the results into a readable format.

### **D.2 Animation Snapshots**

Much of the information that describes how the airspace, airfield, and squadrons function is non-visual; requirements, rules, and procedures are textual database entries. However, the software user interface provides graphical depictions of the spatial relationships between the airfield, airspace, aircraft in flight, and the operating areas. In addition, the software can generate an animation replay of a simulated day on the computer display. This tool is important for visual verification of the accuracy of modeled operations.

Figure D-2 is a NASMOD animation snapshot of the computer display that shows the NAS Oceana airfield. It is interesting to note that the simulation time of the snapshot is 24:42:23 (local) which indicates that the day's flight operations are extending past midnight. This is useful for distinguishing between missions that launch early on a given day with those that are continuing from a previous day. Note the positions of the various aircraft. The symbology conveys information about each aircraft. The attitude of an aircraft icon shows the general direction of travel. A number of labels may be displayed for each icon as described in the following example:

F180\_L5 Squadron—the Atlantic F/A-18 fleet squadron 5

Altitude—10 hundred feet (i.e., 1000 feet)

152 kt Speed—152 nautical miles per hour, true airspeed

The animation can also identify the nature of the aircraft behavior by a user-selected color. In Figure D-2, blue denotes arriving or enroute aircraft, green denotes departing aircraft, and red denotes holding aircraft. Note that the icons are not intended to reflect the actual size of the aircraft.

Four F/A-18s are arriving via the overhead break and landing on Runway 5L. One F/A-18 (the northernmost) is in the midst of its break at 1300 feet and approximately 257 knots; a second F/A-18 is on the downwind leg at 1000 feet and 152 knots; a third F/A-18 is on the base leg at 500 feet and 152 knots; and a fourth F/A-18 is landing on the runway and is at 90 knots in its deceleration. These F/A-18s are blue to denote their status as "arrival" aircraft.

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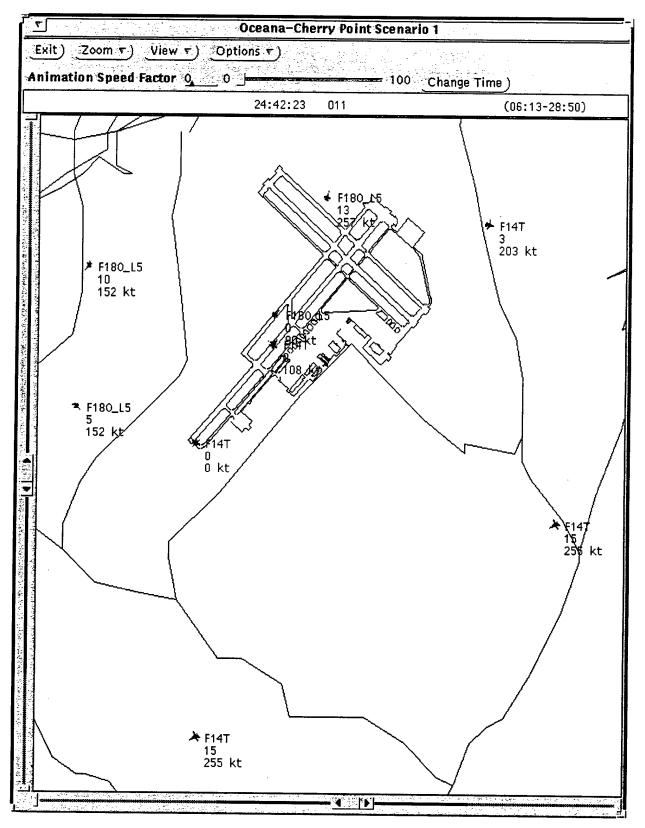


Figure D-2: Animation Snapshot of NAS Oceana Airfield Operations



Meanwhile, five F-14s from the FRS are departing Runway 5R to transit to NALF Fentress. The two southernmost F-14s have already reached 1500 feet and 255 knots; a third F-14 has reached 300 feet and 203 knots as it is executing is right-hand turning climbout; and a fourth F-14 is accelerating down Runway 5R in its takeoff roll and has reached about 108 knots. All four of these F-14s are green to denote their "departure" status. The fifth F-14 is waiting for clearance to depart at the end of the Runway 5R. It is red to alert the analyst that it is holding.

Figure D-3 presents an animation snapshot of the airspace and training areas close to NAS Oceana for ARS-1. NASMOD does not attempt to model the actual flight tracks of aircraft while they are within the various training areas but, instead, logs the time every aircraft enters and departs such areas. The analyst can then choose to display area labels when viewing an animation. When an aircraft enters a modeled area, the counter associated with an area label is incremented. The counter simply lets the analyst know how many aircraft are within the specific training area at that instant. The counter is decremented when an aircraft leaves an area. Such labels and counters are shown in Figure D-3. At the instant of the snapshot (14:18:00 local), there are nine aircraft within W-72 and an additional four within the TACTS range specifically. There is also one aircraft at the Navy Dare bombing range. Two aircraft icons are seen in close proximity to W-72; an aircraft from Atlantic F/A-18 fleet squadron 8 is about to enter W-72 while an aircraft from Atlantic F-14 fleet squadron 5 has just departed W-72. These aircraft are on the outer extremities of the modeled NAS Oceana airfield/pattern structure. A number of aircraft are located at the airfield (either on the ground or in the pattern) and, consequently, their icons overlay one another in the figure due to the lower magnification of this view.

In addition to the area labels, the animation can display a listing of all activities occurring within training areas. A portion of this listing is shown in the inset titled Current Area-Activity Information in the figure. The items in red are activities that are occurring at that instant during the animated replay of the simulation. Some areas cannot be adequately displayed on the main animation screen because they do not have geographic boundaries. For example, the first line in the list indicates to the analyst that two aircraft are currently performing a twenty-minute offensive air support (air interdiction) activity on VR73. The listing further indicates that five aircraft are using NALF Fentress for FCLP training and one aircraft is currently using the Navy Dare range. This can be verified on the main animation display by observing the corresponding area labels and counters.

Figure D-4 shows an animation snapshot of MCAS Cherry Point taken from ARS-5. (This corresponds to ATAC Scenario 11 as indicated in the window title.) The animation software can import computer-aided design (CAD) drawings to the display; consequently, the figure shows a current drawing obtained from the MCAS Cherry Point facilities department. While the CAD drawings used for the animation snapshots may not reflect the airfield configuration of the scenario, the underlying model structure governing the movement of aircraft does incorporate the assumptions pertinent to the given scenario.



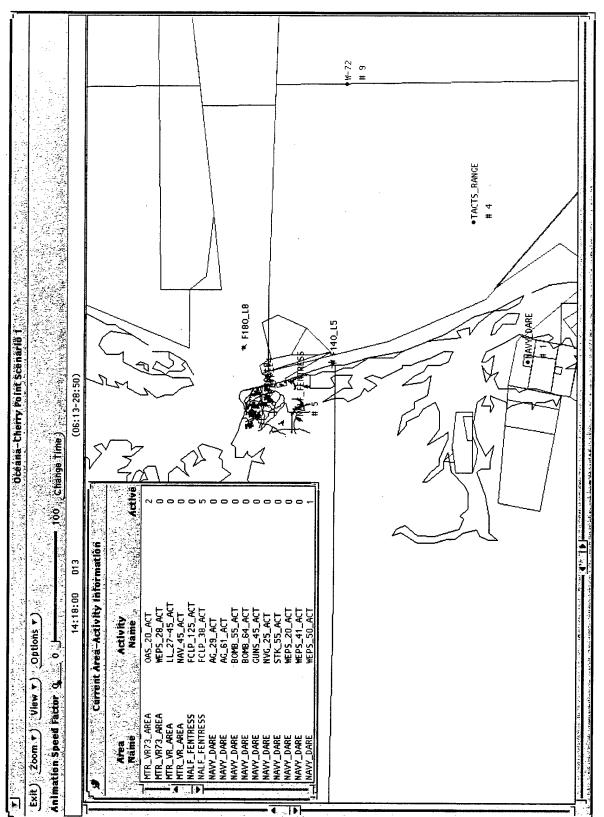


Figure D-3: Animation Snapshot of NAS Oceana Region Airspace Operations



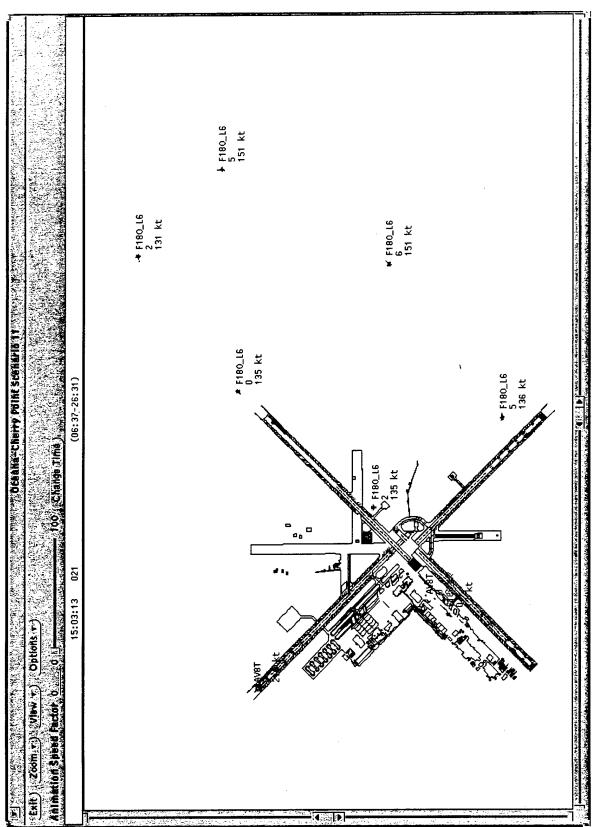


Figure D-4: Animation Snapshot of MCAS Cherry Point Airfield Operations



This figure captures a moment at which FCLP operations are underway. The aircraft are from Atlantic F/A-18 fleet squadron 6. Six aircraft are in the FCLP pattern on Runway 23R. As with Figure D-2, the approximate attitude, altitude, and speed of the aircraft can be discerned. At the same time, an AV-8B from the FRS is departing from Runway 32R. Another AV-8B and F/A-18 are taxiing on the southwest ramp area.

Figure D-5 is similar to Figure D-3 in that it displays some of the training areas with labels and counters in a lower magnification. Likewise, it provides the current activity list. As stated earlier, aircraft icons are displayed only when the aircraft are in close proximity to the airfield. In the figure, two F/A-18s have recently departed W-122 and are returning to MCAS Cherry Point. An EA-6B is on the final approach to Runway 32L. A transient jet aircraft is approaching from the northwest. The blue icon color designates these aircraft as "arrivals". A number of other aircraft are either in the pattern or taxiing at the airfield and their overlaying icons are green. The visible portion of the activity list shows that activities are in progress at BT-11 and BT-9. These activities are approximately 30-minute air-to-ground training exercises consisting of two aircraft each. Other missions are currently in R-5306D, W-122, the W-72 TACTS range, the Navy Dare range, and possibly other regions not visible on the displayed portion of the map.



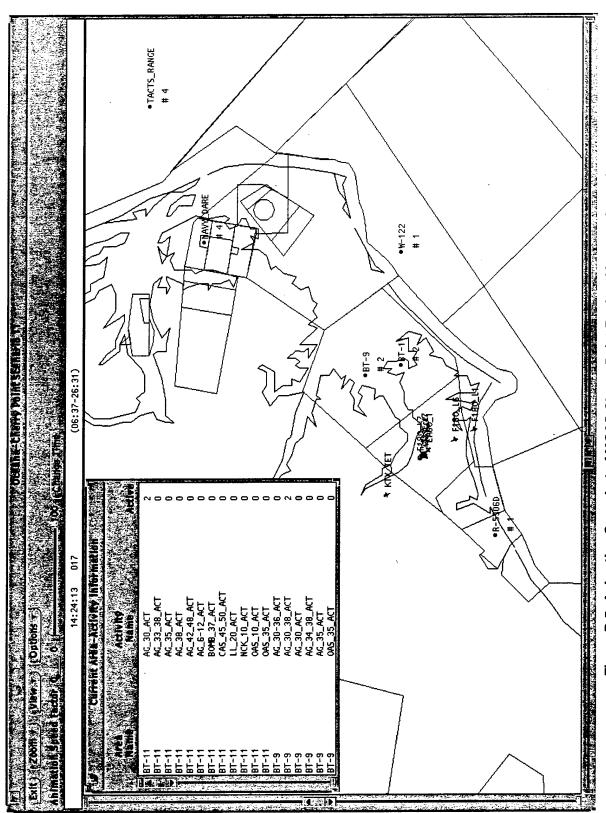
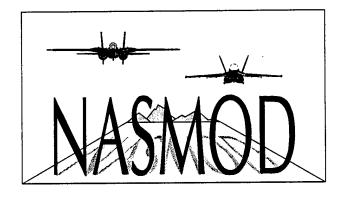


Figure D-5: Animation Snapshot of MCAS Cherry Point Region Airspace Operations





GLOSSARY, ACRONYMS AND ABBREVIATIONS, AND REFERENCES

# **GLOSSARY**

Term	Acronym	Definition
		(* = adapted from FAA, 7110.65H Air Traffic Control, "Glossary")
Air traffic control assigned airspace	ATCAA	*Airspace of defined vertical/lateral limits, assigned by ATC, for the purpose of providing air traffic segregation between the specified activities being conducted within the assigned airspace and other IFR air traffic.
Airfield event		An aircraft operation on the surface or in the vicinity of an airfield. Examples include a departure, an arrival, a touch-and-go pass, an FCLP pass, an overhead break, a pad landing, a low approach.
Airfield operation		An airfield event that is a landing or a takeoff. Examples include a departure, an arrival, a pad landing. Touch-and-go landings, FCLPs, and low approaches count as two airfield operations each (e.g., the "touch" and the "go").
Alert area	<b>A</b> -	*A type of special use airspace that may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
Arrival		An aircraft landing out of non-local traffic or from local training areas. The landing may be to a full stop or may continue without stopping into, for example, a touch-and-go or low approach airfield event.
Break		See Overhead break
Controlled airspace		*An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.
Cross-country		A type of flight that normally spans more than one day from time of departure from base to time of return to base.
Departure		An aircraft taking off to non-local traffic or to local training areas. The takeoff may be after taxi from the flight line or after completing, for example, a touch-and-go or low approach airfield event.
Detachment		The movement of all or part of a squadron from the normal home base to another location for a temporary period of time in order to conduct a prescribed set of training exercises.
Division flight		A flight of three or four aircraft.
Field carrier landing practice	FCLP	A training event that uses the airfield to practice landings on an aircraft carrier.



Final approach		*A component of an airfield's traffic pattern: a flight path in the direction of landing along the extended runway centerline, normally extending from the base leg to the approach end of the runway.
Fleet replacement squadron	FRS	A squadron whose mission is to train new and returning Navy and Marine aviators in the operation of a particular type of aircraft.
Flight		One or more aircraft departing a base airfield, conducting one or more missions, possibly including landings and takeoffs at other airfields, and returning to base.
Flight hour		An hour of airborne flight time, including air taxi but excluding ground taxi and other ground operations.
Flight level	FL	*A level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury; stated in three digits that represent hundreds of feet, e.g., flight level 250 (FL250) represents a barometric altimeter indication of 25,000 feet.
Ground controlled approach	GCA	*A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio.
Instrument approach		*Also "instrument approach procedure." A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.
Instrument flight rules	IFR	*Rules governing the procedures for conducting instrument flight.
Instrument flight rules Instrument meteorological conditions	IFR IMC	*Rules governing the procedures for conducting instrument flight.  *Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.
Instrument meteorological		*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual
Instrument meteorological conditions		*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.
Instrument meteorological conditions Landing		*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.  An aircraft approach to and touch down on the airfield surface.  *Aircraft operating in the traffic pattern or within sight of the tower, or aircraft departing to or arriving from flight in local training areas, or
Instrument meteorological conditions  Landing  Local traffic		*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.  An aircraft approach to and touch down on the airfield surface.  *Aircraft operating in the traffic pattern or within sight of the tower, or aircraft departing to or arriving from flight in local training areas, or aircraft executing practice instrument approaches at the airfield.  *An approach over an airfield or runway where the pilot intentionally
Instrument meteorological conditions  Landing  Local traffic  Low approach  Military operations	IMC	*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.  An aircraft approach to and touch down on the airfield surface.  *Aircraft operating in the traffic pattern or within sight of the tower, or aircraft departing to or arriving from flight in local training areas, or aircraft executing practice instrument approaches at the airfield.  *An approach over an airfield or runway where the pilot intentionally does not make contact with the surface.  *A type of special use airspace of defined vertical and lateral dimensions established outside Class A airspace (i.e., below 18,000 feet MSL) to separate/segregate certain military activities from IFR traffic and to



Out-and-in flight

A flight that leaves the base airfield, operates in one or more training areas, lands at a second airfield for refueling and layover, departs the second airfield, operates in one or more training areas, and returns to the base airfield.

Overhead break

\*Also "overhead maneuver" or "break." A series of predetermined maneuvers prescribed for aircraft (often in formation) for entry into the VFR traffic pattern and to proceed to a landing. A break usually includes the following components: (1) an initial approach three to five miles in length; (2) an elliptical pattern consisting of two 180-degree turns; (3) a break point at which the first 180-degree turn is started; and (4) altitude at least 500 feet above the conventional pattern.

**Profile** 

Also "flight profile" or "mission profile." A sequence of steps that specifies the ordered elements of a flight, such as resources requested and returned, routes flown, training areas worked in and time spent there, and weather and other conditions that may abort or otherwise change the steps accomplished.

Resource

An asset whose supply is fixed and accounted for as flights request it in order to carry out their missions. If a resource is not available when requested, the mission is either delayed or aborted. Examples include aircraft, instructors, TACTS pods, and bomb racks.

Restricted area

R-

\*A type of special use airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

Section flight

A flight of two aircraft.

Sortie

(1) In the context of squadron operations: one aircraft making one departure and one arrival. (2) In the context of training area operations: one aircraft entering a region of airspace, operating there for a period of time, and leaving.

Special use airspace

**SUA** 

\*Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.

Standdown

The period of time, typically about one month, immediately after a return from a carrier deployment during which a fleet squadron performs a minimal level of flight operations.

Stereo route

\*Also "coded route." A routinely used and officially established route of flight, identified by a coded name in order to minimize flight plan handling and communications.

Tactical air navigation TACAN

\*An ultra-high frequency electronic air navigation aid that provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

**Takeoff** 

An aircraft lifting off the airfield surface.



Taxi		*The movement of an airplane or wheeled helicopter under its own power on the surface of an airfield.
Touch-and-go landing	·	*An operation by an aircraft that lands and takes off on a runway without stopping or exiting the runway.
Traffic pattern		*The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport.
Training area		A ground or airspace area where squadron flight operations take place, e.g., a range, outlying landing field, or special use airspace.
Training event		A type of mission that accomplishes a specific training requirement.
Turnaround cycle		The period prior to deployment that a squadron spends training at its base airfield or on detachment.
Visual approach		*An approach conducted on an IFR flight plan that authorizes the pilot to proceed visually and clear of clouds to the airfield., always with the airfield or the preceding aircraft in sight.
Visual flight rules	VFR	*Rules that govern the procedures for conducting flight under visual conditions.
Visual meteorological conditions	VMC	*Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.
Warning area	<b>W</b> -	* A type of special use airspace that may contain hazards to nonparticipating aircraft in international airspace.
Workup		The training performed by fleet squadrons between two carrier deployments.



# **ACRONYMS AND ABBREVIATIONS**

AA air-to-air

ACLS automated carrier landing system

ACM air combat maneuvers

AFB Air Force Base

AG air-to-ground

AGL above ground level

AIRLANT Naval Air Forces, Atlantic

AIRPAC Naval Air Forces, Pacific

ARS Alternative Realignment Scenario
ARTCC air route traffic contol center

ATC air traffic control

ATCAA air traffic control assigned airspace
BRAC Base Realignment and Closure

BT bombing target

C2X Competitive Training Unit Exercise

CAD computer-aided design
CAX Combined Arms Exercise
CCA carrier controlled approach

CINCLANTFLT Commander-in-Chief, Atlantic Fleet

CQ carrier qualification CVW carrier airwing

FAA Federal Aviation Administration

FACSFAC Fleet Area Control and Surveillance Facility

FBO forward base operations
FCLP field carrier landing practice

FL flight level

FMF Fleet Marine Force

FRS fleet replacement squadron FTU fighter training unit

FU fighter unit

FWT fighter weapons training

FY fiscal year

GCA ground controlled approach
GUI graphical user interface

ICLS instrument Carrier Landing System

IFR Instrument Flight Rules

IMC instrument meteorological conditions

IR instrument route

IUT instructor under training
JRB Joint Reserve Base

JTFEX Joint Training Fleet Exercise KTS knots (nautical miles per hour)

LAT low altitude training

MAEWR Mid-Atlantic Electronic Warfare Range

MCAS Marine Corps Air Station
MCB Marine Corps Base

MCOLF Marine Corps outlying landing field

MEU Marine Expeditionary Unit MOA military operations area

MSL mean sea level

MTR military training route



NALF Naval Auxiliary Landing Field

NAS Naval Air Station

NASMOD Naval Aviation Simulation Model
NATS Navy Air Training System Model
NAVFAC Naval Facilities Engineering Command
NFE Naval Auxiliary Landing Field Fentress

NFO Naval flight officer
NM nautical miles

NTU Naval Air Station Oceana
NVG night vision goggles
OLF outlying landing field

PALS precision approach landing system

PAR precision approach radar RAC replacement aircrew

RATCF Radar Air Traffic Control Facility

RIO radar intercept officer

S/F strike/fighter

SFARP Strike Fighter Advanced Readiness Program
SIMMOD FAA Airfield and Airspace Capacity Model

SOA special operating area

SOES Station Operations and Engineering Squadron

SUA Special Use Airspace
T&R Training & Readiness
TACAN Tactical Air Navigation

TACTS Tactical Aircrew Combat Training System
TARPS Tactical Air Reconnaissance Pod System
TSTA Tailored Ship Training Availability

UAV unmanned aerial vehicle
UDP Unit Deployment Program

VACAPES Virginia Capes VFR visual flight rules

VMC visual meteorological conditions

VORTAC Very High Frequency Omnidirectional Range Tactical Air Navigation

VR visual route



### REFERENCES

The data required for this study was collected from a wide variety of sources over a three and half year period and consists of both titled/prepared documentation (e.g., reports, letters, faxes, memos, manuals, maps) and untitled materials (e.g., computer printouts, interview notes). This section provides a listing of the significant sources that were consulting during the construction of the model.

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#### **Personnel Sources**

The most important sources of information for this study are the personnel who have expert knowledge of operations being simulated. Most of the information entered into the model are derived directly through interviews with these individuals. Any data obtained through document sources were verified by appropriate personnel.

The following list is a compilation of those whose input has directly supported the effort to complete this study. The ranks, rates, and roles listed below were current at the time that individual contributed to the study.

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CAPT	L.	Brock	Schedules, 23OSS/OSOSF, Pope AFB
	C.	Brown	Range Schedules, FACSFAC VACAPES



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# **Suggested Compatible Land Uses in Noise and Accident Potential Zones**

Derived from Chief of Naval Operations Instruction (OPNAVINST) 11010.36A, AICUZ Program Procedures and Guidelines for Department of the Navy Air Installations.

AICUZ

PROGRAM PROCEDURES

AND

**GUIDELINES** 

FOR

DEPARTMENT OF THE NAVY

AIR INSTALLATIONS

TABLE 1. SUGGESTED LAND USE COMPATIBILITY IN NOISE ZONES

	LAND USE	NOISE ZONES/DNL Levels in Ldn							
SLUCM		1		2			. 3		
NO.	NAME	0-55	55-65	65-70	70-75	75-60	80-85	85+	
10	Residential								
11	Household units			3	3		••		
11.11	Single units; detached	Y	<b>A</b> *	_ 25 <u>1</u>	301	N	N	N.	
11.12	Single units; semidetached	Y	<b>Y</b> *	251	30 <sup>1</sup>	N	N	N	
11.13	Single units; attached row	Y	Υ×	25 <u>1</u>	301	N	N	N	
11.21	Two units; side-by-side	Y	<b>A</b> *	25 <sup>1</sup>	30 <sup>1</sup>	Ŋ	N	N	
11.22	Two units; one above the			1	201		**	.,	
	other	Y	Ä*	25 <sup>1</sup>	30 <u>1</u>	N	N	N	
11.31	Apartments: walk up	Y	λ*	25 <u>1</u>	30 <sup>1</sup>	N	N	N	
	Apartments; elevator	Y	Ā*	25 <u>1</u>	301	N	N ·	N	
12	Group quarters	Y	X*	25 <sup>1</sup>	30 <sup>1</sup> 30 <sup>1</sup>	N	N N	n N	
13	Residential hotels	Y	X*	25 <sup>1</sup>		N	N	N	
14	Mobile home parks or courts	Y	Y*	N Del	и 301	ม 35 <sup>1</sup>	N	N N	
15	Transient lodgings	Y Y	Y*	25 <sup>1</sup> 25 <sup>1</sup>	301	N 3>-	N	N	
16	Other residential	ī	1.		30-	41	.,	••	
. 20	Manufacturing								
21	Food & kindred products;				9	?	1		
	manufacturing	Y	Y	Y	¥2	<b>Y</b> 3	Y <sup>4</sup>	N	
22	Textile mill products;		•		?	<sub>Y</sub> 3	A		
	manufacturing	Y	Y	Y	¥2	Ϋ́	. ¥ <sup>4</sup> ,	N	
23	Apparel and other finished products made from fabrics, leather, and similar materials;								
	manufacturing	Y	Y	Y	¥2	<b>Y</b> 3 ·	Y <sup>4</sup>	N	
24	Lumber and wood products	•	_	_	_				
24	(except furniture);		•	•					
	manufacturing	Y	Y	Y	<b>Y</b> 2	` <sub>Y</sub> 3	$\mathbf{Y}^{4}$	N	
25	Furniture and fixtures;		_	_	_	_			
23	manufacturing	Y	Y	Y	<sub>.</sub> ¥2	<b>y</b> 3	$\mathtt{Y}^{4}$	N	
26	Paper & allied products;				•			•	
20	manufacturing	Y	Y	Y	¥2	<b>y</b> 3	<b>y</b> 4 ·	N	
27	Printing, publishing, and	_							
21	allied industries	Y	Y	Y	<b>y</b> 2	<b>y</b> 3	Y <sup>4</sup>	n :	
28	Chemicals and allied		•		_				
20	products; manufacturing	Y	Y	Y	¥2	<b>y</b> 3	. Y <sup>4</sup>	N	
29	Petroleum refining and								
	related industries	Y	Y	Y.	<b>y</b> 2 .	<b>Y</b> 3	. <b>y4</b>	. N	
	IETGren Tungerties								

<sup>\*</sup>The designation of these uses as "compatible" in this zone reflects individual Federal agencies' consideration of general cost and feasibility factors as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, may have different concerns or goals to consider (Guidelines for Considering Noise in Land Use Planning and Control, June 1980).

OPNAVINST 11010.36A
TABLE 1. SUGGESTED LAND USE COMPATIBILITY IN NOISE ZONES

	LAND USE		NOISE ZONES/DNL Levels in Ldn							
SLUC		1			2		3			
NO.	NAME	0-55	55-65	65-70	70-75	75-80	80-85	854	-	
30	Manufacturing (cont'd)									
31	Rubber and misc. plastic				_					
	products; manufacturing	Y	Y	Y	y2	<b>Y</b> 3	<b>Y</b> 4	N		
32 -	Stone, clay and glass		• •		•	•				
72	products; manufacturing	Y Y	Y	Y	¥2	λ3.	Y4	Ŋ		
33 34	Primary metal industries Fabricated metal products;	¥	¥	Y	<b>y2</b>	¥3 ,	Y <sup>4</sup>	N		
34	manufacturing	Y	Y	Y	ý2	<b>Y</b> 3	<b>Y</b> 4	3.7		
. 35	Professional, scientific,	<b>.</b>	-	I	7-	10	La	N		
	and controlling instru-									
	ments; photographic and									
	optical goods; watches	•	•							
٠.	and clocks -									
	manufacturing	Y	Y	Y	25	30	N	N		
39	Miscellaneous manufacturing	Y	Y	Y	<b>y</b> 2	<b>Y</b> 3	<b>y</b> 4	N		
40	Managarahahian asamuni									
40	Transportation, communi- cation and utilities									
41	Railroad, rapid rail									
32	transit and street									
	railway transportation	Y	Y	Y	<b>y</b> 2	<b>y</b> 3	Y <sup>4</sup>	N		
42	Motor vehicle transportation	Ÿ	Ÿ	Ÿ	<b>y</b> 2	<b>Y</b> 3	<b>y</b> 4	N		
43	Aircraft transportation	Y	Ÿ	Ÿ	<b>y</b> 2	<u> </u>	¥4	N .		
44	Marine craft transportation	Y	. Y	Y	<u>v</u> 2	<b>ү</b> 3 <b>ү</b> 3	<b>Y</b> 4	N		
45	Highway & street right-of-		•		_	_				
40	way	Y	Y	Y	y2	y3	. ¥4	N		
46 47	Automobile parking Communication	Y	Y	Y	¥2	γ3 205	<b>Y</b> 4	N	•	
48	Utilities	Y Y	Y Y	Y Y	25 <sup>5</sup> Y <sup>2</sup>	30 <sup>5</sup> Y <sup>3</sup>	N Y <sup>4</sup>	N		
49	Other transportation,	•	1	7	1-	I	12	N		
	communication and									
	utilities	Y	. <b>Y</b>	Y	255	305	N	N		
			•	_				•		
50	Trade				•	_	_			
51	Wholesale trade	Y	Y	Y	<b>y</b> 2	<b>X</b> 3	Y <sup>4</sup>	N		
<b>5</b> 2	Retail trade - building				<b>.</b>					
	materials, hardware and	v			2	3	A			
53	farm equipment Retail trade — general	Y	Y	. Y	<b>Y</b> 2	<b>Y3</b>	<b>Y</b> 4	N		
<b>J</b> J	merchandise	Y	. <b>Y</b>	Y	25	30	N			
54	Retail trade - food	. Ÿ	Ŷ	·Ŷ	25	30	N	n N	•	
55	Retail trade - automotive,	• -	•	•	23	50		N		
	marine craft, aircraft									
• •	and accessories	Y	Y	Y	25	30	N	N		
56 ·	Retail trade - apparel and				•			<b>,</b>		
	accessories	Y	Y	Y	25	30	N	N		
57	Retail trade - furniture,	•								
	home furnishings and		•			20		-		
	equipment	Y	Y	Y	25	30	N	N		
58 .	Retail trade - eating and	Y	v	v	25	20	17	27		
50	drinking establishments	Y	Y	Y Y	25 25	30 30	N N	n N		
59	Other retail trade	<u>.</u>	. *	7	23	<b>3</b> 0	74	IA		

	LAND USE		•		,		in L <sub>dn</sub>	
SLUCM	"	1		2			3	
NO.	NAME	0-55	55-65	65-70	70-75	75–80	80-85	85+
60	Services		·····					
61	Finance, insurance and		•					
	real estate services .	Y	Y	Y	25	30	N	N
62	Personal services	Y	Y	Y	25	30	N	N 17
62.4	Cemeteries	Y	Y	, <b>Y</b>	<b>y</b> 2	λ3΄	Y4,11	y6,11
63	Business services	Y	Y	Y	25	30 ~	N	N
64	Repair services	Y	Y	Y	<b>y</b> 2	<b>Y</b> 3	<b>y</b> 4	N
65	Professional services	Y	Y.	Y	25	30	N	N
65.1	Hospitals, nursing homes	Y	<b>Y</b> *	25*	30*	N	N	N
65.1	Other medical facilities	Y	Y	Y	25	30	N	N
66	Contract construction							
	services	Y	Y	Y	25	30	N	N
67	Governmental services	Y	<b>Y*</b>	Y*	25*	30*	N	N
68	Educational services	Y	Y*	25*	30*	N	N	N
69	Miscellaneous services	Y	Y	Y	25	30	N	N
70 71	Cultural, entertainment and recreational Cultural activities						٠	
11	(including churches)	Y	Y*	25*	30*	N	N	N
71.2	Nature exhibits	Ÿ	Y*	Y*	N	N	N	N
72.2	Public assembly	Ÿ	Ŷ	Ÿ	N	N	N	
72.1	Auditoriums, concert halls	Ŷ	Ŷ	25	30	N	N	N.
	Outdoor music shells,	_	_					
	amphitheaters	Y	. A*	N	N	N	N	N
72.2	Outdoor sports arenas,			7	7			
	spectator sports	Y	Y	¥ <sup>7</sup>	¥7	N	N	N
73.	Amusements	Y	Y	Y	Y	N	n	N
74	Recreational activities							
	(incl. golf courses,			•				
	riding stables, water							
	recreation)	Y	Y*	<u>Y</u> *	25*	30*	N	N
<b>75</b>	Resorts and group camps	Y	.X*	Y*	Y*	N	N	N
<b>7</b> 6	Parks	Y	<b>X</b> *	Y*	Y*	N	N	N
79	Other cultural, entertain-				_			
	ment and recreation	Y	Y*	Y*	. X*	N	N	N
•	_		:					
80	Resource production and			•	•			
	extraction.			•				
81	Agriculture (except live-		1		•	30	70.17	
	stock)	, <b>Y</b>	Y	X8	<b>y</b> 9	Y10	Y10,11	¥10,11
81.5	Livestock farming and			_	_	•	•	
81.7	animal breeding	Y	Y	78	<b>Y</b> 9	N	N	N
82	Agricultural related			_	_			
	activities	. <b>Y</b>	Y	<b>y</b> 8	χ9 .	<b>Y</b> 10	¥10,11	Y10,11
83	Forestry activities and			_				
	related services	Y	Y	<b>y</b> 8	<b>Y</b> 9	Y10	y10,11	Y10,11
84	Fishing activities and			. ,				
	related services	Y	· <b>Y</b>	Y	Y .	Y	Y	Y
05	Mining activities and		_				•	
85	related services	Y	Y	Y	Y	Y	Y	Y
89	Other resource production	-	_	-	. –	_	_	

### NOTES FOR TABLE 1

- 1. a) Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-70 and strongly discouraged in DNL 70-75. The absence of viable alternative development options should be determined and an evaluation should be conducted prior to approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones.
  - b) Where the community determines that residential uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB (DNL 65-70) and 30 dB (DNL 70-75) should be incorporated into building codes and be considered in individual approvals. Normal construction can be expected to provide a NLR of 20 dB, thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.
  - c) NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, design and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures which only protect interior spaces.
- 2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.
- 3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low
- 4. Measures to achieve NIR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low
- 5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.
- 6. No buildings.
- 7. Land use compatible provided special sound reinforcement systems are installed.
- 8. Residential buildings require a NLR of 25.
- 9. Residential buildings require a NLR of 30.
- 10. Residential buildings not permitted.
- 11. Land use not recommended, but if community decides use is necessary, hearing protection devices should be worn by personnel.

# KEY TO TABLE 1

STLICM

Standard Land Use Coding Manual

Y (Yes)

Land Use and related structures compatible

without restrictions.

N (No)

Land Use and related structures are not compatible and should be prohibited.

NTR (Noise Level Reduction)

Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction

of the structure.

YX (Yes with restrictions)

Land Use and related structures generally

compatible; see notes 2 through 4.

25, 30, or 35

Land Use and related structures generally compatible; measures to achieve NLR of 25, 30 or 35 must be incorporated into design

and construction of structure.

25\*, 30\* or 35\*

Land Use generally compatible with NLR; however, measures to achieve an overall noise reduction do not necessarily solve noise difficulties and additional evaluation

is warranted.

DNL

Day-Night Average Sound Level.

Lan

Mathematical symbol for DNL.

TABLE 4. SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

	LAND USE	CLEAR		<u>-</u>
SLUCM NO.	:		APZ-1	APZ-2
10	Residential			
11	Household units	•		
11.11	Single units: detached	N	N .	Υl
11.12	Single units: semidetached	N.	N	u u
11.13	Single units; attached row	N-	N	N N
11.21	Two units: side-by-side -	N·.	N	N
11.22	Two units; one above the			
ı	other	N.	N	N
11.31	Apartments: walk up	N -	N	N
11.32	Apartments: elevator	N.	И	N
12 .	Group quarters	N.	N ·	N
13	Residential hotels	N.	N	N
14	Mobile home parks or courts	N.	N	N
15	Transient lodgings	И.	N	N
16	Other residential	N.	N	N <sup>1</sup>
				· ·
20	Hanufacturing	1		
21	Food & kindred products;			
1	manufacturing	N.	N <sup>2</sup>	A
22	Textile mill products:	.	N <sup>2</sup>	
. 23	manufacturing	N.	N-	Y
23	Apparel and other finished	1. 1	ĺ	
ļ	products made from fabrics, leather, and	'		
			ļ	
	similar materials:		.,	N <sup>2</sup>
	manufacturing	N	N	N-
24	Lumber "and "wood products"		1	
	(except furniture);			
25	manufacturing	N	y <sup>2</sup>	Y
25	Furniture and fixtures:		<sub>¥</sub> 2	
26	manufacturing	N·	1-	Y
20	Paper & allied products:		y <sup>2</sup> .	.
27	manufacturing	N	7-	Y
27	Printing, publishing, and	N	<del>y</del> 2	₹ .
28	allied industries Chemicals and allied		·	I .
20		N	N	N <sup>2</sup>
29	products; manufacturing Petroleum refining and	'I	~	M
23	related industries	N·	N :	N
	Letated ludderties	1	N	N

TABLE 4. SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

	LAND USE	CLEAR	APZ-1	APZ-2
SLUCM NO.	NAME	ZONE		
30	Manufacturing (cont'd)			
31	Rubber and misc. plastic products; manufacturing	N	N <sup>2</sup>	N <sup>2</sup>
32	Stone. clay and glass products; manufacturing	N	N <sup>2</sup>	Ÿ
33 34	Primary metal industries - Fabricated metal products;	N	n <sup>2</sup>	Y
	manufacturing Professional, scientific,	N	ห <sup>2</sup>	Y
35 .	and controlling instru- ments: photographic and optical goods: watches and clocks -			
39 <sub>.</sub>	manufacturing Miscellaneous manufacturing	N N	N ¥2	N <sup>2</sup> Y <sup>2</sup>
40	Transportation, communi- and utilities			
41	Railroad. rapid rail transit and street railway transportation	N3	¥4	Ÿ
12	Motor vehicle transportation	N3 ·	Y <sup>4</sup> Y Y <sup>4</sup> Y <sup>4</sup> ·	A A
43 44	Aircraft transportation Marine craft transportation	₩3 .	<b>y</b> 4 ⋅	Y
45	Highway & street right-of- way	N3	y4 y4 y4	
<b>4</b> 6	Automobile parking	- N3	<del>v</del> 4	Y Y
47 48	"Communication Utilities	N <sub>3</sub> .	¥4	¥
49 49	Other transportation. communication and utilities	ηЗ	<u>¥</u> 4 .	Y
50	Trade	,	<b></b> 2	•••
51 52	Wholesale trade Retail trade - building materials. hardware and	N ·	<b>y</b> 2	<b>Y</b>
·	farm equipment	N	¥2	Ā
53	Retail trade - general merchandise	Ņ	N <sup>2</sup> N <sup>2</sup>	y2 y2
54 55	Retail trade - food Retail trade - automotive, marine craft, aircraft	N		• .
	and accessories	N	¥ <sup>2</sup>	Y
56	Retail trade - apparel and accessories	N	N <sup>2</sup>	¥ <sup>2</sup> .
57	Retail trade - furniture.  home furnishings and equipment	N	N <sup>2</sup>	¥ <sup>2</sup>
58 .	Retail trade - eating and drinking establishments	N	พ	N <sup>2</sup>
59 .	Other retail trade	N	. N2 .	¥ <sup>2</sup>

TABLE 4. SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES

SLUCM NO. 60 61 62 62.4 63 64	NAME Services Finance. insurance and real estate services Personal services	CLEAR ZONE	APZ-1	APZ-2
61 62 62.4 63 64	Finance, insurance and real estate services			
62 62.4 63 64	real estate services		1	
62.4 63 64			ł	
62.4 63 64	Domest complete	N·	N	<del>√</del> 6
63 64	Personal Services	N.	N	<del>y</del> 6
64	Cemeteries	N	Y7 Y8 Y <sup>2</sup> N	Y6 Y6 Y7 Y8 Y Y6
	Business services .	N	<del>∑</del> 8	₹8
	Repair services	N	<b>y</b> 2	Y
65	Professional services	N.	N	₹6
65.1	Hospitals. nursing homes	N	N	ที
65.1	Other medical facilities	N.	N	N
66 .	Contract construction			
	services	N.	уб	Y
67	Governmental services	N.	N	y y6
68	Educational services	N.	N .	N
69	Miscellaneous services ·	N.	N <sup>2</sup>	N Y2
•			1	1
70	Cultural, entertainment			
	and recreational			1
71	Cultural activities			
	(including churches)	N.	N	<sub>N</sub> 2
71.2	Nature exhibits	N.	ท ชู2	¥
<b>7</b> 2	Public assembly	N.	N	N
72.1	Auditoriums, concert halls	N	N	N
72.11	Outdoor music shells.	1 1		
_	amphitheaters	N	Ŋ	N.
72.2	Outdoor sports arenas.			
_	spectator emits	N -	N	N
73 <sup>-</sup>	Amusements -	N :	.N	. γ <sup>8</sup>
74	Recreational activities	1		•
	(incl. golf courses,	. }		
	riding stables, water			
	recreation)	N·	<u>v</u> 8.9,10	Y
75	Resorts and group camps	N·	N_	N .
76	Parks	N·	¥8	Ŷ8
79	Other cultural, entertain-	1		
l	ment and recreation	N.	<del>20</del>	<b>⊼</b> 3
_	•		. :	_
10	Resource production and	1		
.	extraction	1	•	
1	Agriculture (except live-		1	
	stock)	Y .	Y	₹ .
1.5)	Livestock farming and	1		_
1.75	animal breeding	N ·	Y	Y
2	Agricultural related	. [	_ `	
_	activities	N.	<b>y</b> 5	<b>T</b>
3	Forestry activities and	1 - 1		_
. I	related services	N <sup>5</sup>	. Y	¥
4	Fishing activities and		_	-
ŧ	related services	ุ №5. " =		Y
5	Mining activities and			
ļ	related services	N `	¥5	<b>y</b> .
•	Other resource production	1	.1	- · · ·
1	and extraction	N ·	<b>y</b> 5	Y

#### OPNAVINST 11010.36A

#### NOTES TO TABLE 4

- 1. Suggested maximum density 1-2 dwelling units per acre, possibly increased under a Planned Unit Development (PUD) where maximum lot coverage is less than 20 percent.
- 2. Within each land use category, uses exist where further evaluation may be needed due to the variation of densities of people and structures. For example, where a small neighborhood retail store may be compatible in APZ-II, a shopping center or strip shopping mall would be incompatible due to the density of development and concentration of people.
- 3. The placing of structures, buildings or above—ground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See NAVFAC P-80.3 (NOTAL) for specific guidance.
- 4. No passenger terminals and no major above—ground transmission lines in APZ-I.
- 5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, air pollution.
- 6. Low-intensity office uses only. Meeting places, auditoriums, etc., not recommended.
- 7. Excludes chapels.
- 8. Facilities must be low intensity.
- 9. Clubhouse not recommended.
- 10. Large classes not recommended.

E Air Conformity Determination Report

# Final Clean Air Act Conformity Determination Realignment of F/A-18 Aircraft and Operational Functions to Naval Air Station Oceana, Virginia

**March 1998** 

Prepared by:

**DEPARTMENT OF THE NAVY** 

# **Executive Summary**

Implementation of the 1995 mandates of the Base Closure and Realignment Commission will result in transferring 11 F/A-18 C/D operational squadrons and the F/A-18 C/D Fleet Replacement Squadron (FRS) (180 aircraft) from Naval Air Station (NAS) Cecil Field to other east coast installations. The Navy is currently considering alternative realignment scenarios that would involve transferring these aircraft to one or more installations. One of these scenarios may result in 11 operational squadrons and the FRS of F/A-18 C/D aircraft (180 aircraft) being realigned to NAS Oceana, Virginia Beach, Virginia. This action, if implemented, would include the transfer of approximately 4,100 military and 100 civilian personnel to the station. To accommodate the realignment, some existing facilities would require construction/modification. In addition, this action would affect the level of aircraft operations (e.g., landings, takeoffs, touch-and-go operations, and interfacility flights) at both NAS Oceana and Naval Auxiliary Landing Field (NALF) Fentress, the station's outlying landing field. The purpose of this study is to determine whether this federal action (i.e., this alternative) resulting from the 1995 mandates is subject to the requirements of the Clean Air Act (CAA) General Conformity Rule. The site of this federal action is within the Hampton Roads Air Quality Control Region in Virginia. The marginal ozone nonattainment status of the region was redesignated to attainment on June 26, 1996 (Federal Register [FR] Vol. 62 Number 123). The area is currently subject to an approved ozone maintenance plan.

In addition to the proposed F/A-18 C/D realignment, the Navy is currently undertaking other actions that will affect aircraft loadings at NAS Oceana. These actions include the decommissioning of all A-6 aircraft, changes in the number of F-14 aircraft, and other Base Closure and Realignment (BRAC) actions. The net effects of these actions and the proposed F/A-18 C/D realignment to NAS Oceana are assessed in this document.

Emissions of volatile organic compounds (VOCs) and oxides of nitrogen  $(NO_x)$ , which are both ozone precursor compounds and both subject to requirements of the maintenance plan, are the focus of this conformity determination. Total annual emissions of ozone

precursors include emissions from aircraft flight operations at both NAS Oceana and NALF Fentress, stationary source emissions at NAS Oceana including out-of-aircraft engine testing, other mobile source emissions such as in-aircraft engine testing, ground support equipment, and construction-related emissions. The Navy's initial projection of net annual VOC emissions caused by this alternative realignment scenario (i.e., in the full build-out year—1999) is 50 tons per year, which is 50 tons below the *de minimis* exemption levels specified under the General Conformity Rule (i.e., 100 tons per year). Reasonably foreseeable net annual NO<sub>x</sub> emissions are projected to be approximately 391 tons per year in 1999, exceeding the *de minimis* exemption level by approximately 291 tons. When the *de minimis* exemption level is exceeded, a formal determination that the federal action conforms with the Commonwealth of Virginia's State Implementation Plan (SIP) is required.

Because the net change in VOC emissions is below the *de minimis* exemption level, a formal conformity determination for VOCs is not required. However, the Navy has performed a full conformity analysis for VOCs to be consistent with the format of the draft conformity determination and to account for a refined Navy emissions calculation methodology, which resulted in a difference between the 1993 baseline calculations of the Navy and those of the state.

The Commonwealth of Virginia's Hampton Roads ozone maintenance plan, which has been approved by the United States Environmental Protection Agency (EPA) in accordance with the CAA, incorporates an emission growth allotment. The Navy and other major sources in Hampton Roads participated in the development of the emission budget for the maintenance plan. NAS Oceana's growth allotment resulted from two major ozone precursor sources agreeing to accept a cap, or limit, on their future emission levels. This reduction was set aside for expansion of aircraft operations at NAS Oceana. The projected net NO<sub>X</sub> emissions associated with the proposed action are within the allotment available; therefore, conformity with the Virginia SIP is demonstrated.

1 Introduction

As a result of the 1995 Base Closure and Realignment Commission (Commission) mandates, Naval Air Station (NAS) Cecil Field in Jacksonville, Florida, will be closed, and its critical functions and assets will be transferred to other installations. F/A-18 C/D operational aircraft includes 11 operational squadrons and the F/A-18 C/D Fleet Replacement Squadron (FRS), or a total of 180 aircraft. The Navy is currently considering alternative realignment scenarios involving transferring these aircraft to one or more installations along the east coast. Under these alternatives, up to 11 operational squadrons of F/A-18 C/D aircraft and the F/A-18 FRS C/D may be realigned from NAS Cecil Field, Florida, to NAS Oceana, Virginia Beach, Virginia. The purpose of this conformity review is to demonstrate that direct and indirect air pollutant emissions associated with the proposed construction and operational changes necessary to facilitate the alternative realignment scenarios at NAS Oceana are in accordance with the requirements of the 1990 amendments to the Clean Air Act (CAA) as implemented through 40 Code of Federal Regulations (CFR) Parts 6, 51, and 93, Determining Conformity of General Federal Actions to State or Federal Implementation Plans. which is also known as the "General Conformity Rule." Of the five alternatives analyzed in the EIS, ARS 1 would add the greatest amount of emissions to the Hampton Roads area. Therefore, this conformity demonstration concentrates on ARS 1. Because emissions would be lower for ARSs 2 through 5, it is assumed that if ARS 1 conforms, ARS 2 through 5 would also conform. Specific emissions and calculations for ARS 2 through 5 are included in Appendix F of the EIS.

A comprehensive analysis of the environmental consequences of this realignment is being conducted in compliance with the National Environmental Policy Act (NEPA), and the results are presented in an Environmental Impact Statement (EIS). This conformity review has been conducted in compliance with the CAA as amended (42 United States Code [USC] 7476[c]), the General Conformity Rule, and the Draft Chief of Naval Operations Interim Guidance on Compliance with the Clean Air Act General Conformity Rule.

The federal action, as defined in 40 CFR 93.152, consists of two components: new construction and renovation of existing facilities to support the realignment; and operational changes at and between NAS Oceana and its outlying landing field, Naval Auxiliary Landing Field (NALF) Fentress (i.e., changes in the level of aircraft operations such as landings, takeoffs, touch-and-go operations, and interfacility flights).

# 1.1 Site Location

NAS Oceana occupies 5,650 acres (2,288 hectares) in southeastern Virginia, within the corporate limits of the City of Virginia Beach, approximately 10 miles (16.1 kilometers) east of the City of Norfolk, Virginia (see Figures 1-1 and 1-2). The commanding officer of NAS Oceana also is in charge of NALF Fentress, which is located in Chesapeake, Virginia. This facility is used for training operations associated with aircraft at the station (U.S. Navy 1985).

NAS Oceana and NALF Fentress are located in the Hampton Roads Air Quality Region, which includes the counties of James City, York, Isle of Wight, Accomack, Northampton and Southampton, and the cities of Virginia Beach, Chesapeake, Norfolk, Portsmouth, Suffolk, Newport News, Hampton, Williamsburg, and Poquoson (see Figure 1-3) (VDEQ 1994). With the exception of Isle of Wight, Accomack, Northampton and Southampton counties, this area is currently designated as an attainment area for ozone subject to an ozone maintenance plan.

# 1.2 Defense Base Closure and Realignment Act

As the U.S. Congress reduced defense spending after the end of the Cold War, it sought to establish a process to close and realign military installations in the United States to achieve long-term cost savings. In 1990, Congress enacted the Defense Base Closure and Realignment Act (hereafter referred to as BRAC). Under this statute, the U.S. Secretary of Defense is required to prepare a Force Structure Plan, and evaluate and submit a list of base closures and realignments to an independent commission. The commission is to convene public hearings, review selected installations according to the Force Structure Plan and selection criteria, amend the list as necessary, and then submit the list to the President and Congress for approval. Once the list is approved, the Secretary of Defense is required to proceed with the specified closures and realignments. This process was conducted in 1991, 1993, and 1995.

Under the Commission's 1993 mandates, NAS Cecil Field in Jacksonville, Florida will be closed. Aircraft currently stationed at NAS Cecil Field will be realigned to "other naval air stations, primarily NAS Oceana; Marine Corps Air Station (MCAS) Beaufort, South Carolina; NAS Jacksonville, Florida; and NAS Atlanta, Georgia, or other Navy or Marine Corps air stations with the necessary capacity and support infrastructure." Because of the non-specific language of the 1995 BRAC mandates, the Navy is formulating alternative realignment scenarios for transferring NAS Cecil Field aircraft to other east coast installations. Under these alternatives, up to 11 Atlantic Fleet F/A-18 C/D operational squadrons, each consisting of 12 aircraft, and one F/A-18 C/D FRS, consisting of 48 aircraft, or a maximum of 180 aircraft, may be realigned to NAS Oceana by 1999 (U.S. Navy 1995a).

# 1.3 Other Issues Affecting Realignment at NAS Oceana

The Navy is currently undertaking additional actions that will affect future aircraft loadings at NAS Oceana. These actions involve changes in the population of F-14 and A-6 aircraft at NAS Oceana, and other BRAC actions at the station.

In 1993, 86 A-6 aircraft were stationed at NAS Oceana. The Navy took steps to gradually phase out all A-6 aircraft (and associated support and training activities) by the middle of fiscal year (FY) 1997 (U.S. Navy 1994). In FY 1996, 14 A-6 aircraft were stationed at NAS Oceana. All A-6 aircraft at NAS Oceana were removed by the middle of FY 1997 (U.S. Navy 1995a).

In addition, as a result of the 1993 BRAC recommendations, one F-14 FRS Detachment, consisting of eight F-14 aircraft, were relocated from the West Coast to NAS Oceana in October 1996 (i.e., first month of FY 1997).

Under a separate 1995 BRAC mandate, Pacific Fleet F-14 aircraft stationed at NAS Miramar, California, and their associated military and civilian personnel have been transferred to NAS Oceana. This move capitalizes on existing F-14 support and takes advantage of excess capacity at NAS Oceana (BRAC 1995). This 1995 F-14 realignment involves the relocation of four Pacific Fleet operational squadrons, each containing 14 F-14 aircraft, or a total of 56 aircraft, to the station by 1997 (U.S. Navy 1995a). These squadrons joined the existing six Atlantic Fleet F-14 operational squadrons and the F-14 FRS currently stationed at NAS Oceana.

Under a separate action unrelated to BRAC, one F-14A squadron, consisting of 14 aircraft, has been transferred to the station from NAS Miramar and would have the same operating mission as Atlantic Fleet F/A-18 C/D aircraft. This squadron would fulfill this mission until additional F/A-18 C/D aircraft are added to the Navy's inventory.

These other actions were the subject of separate NEPA documentation and General Conformity reviews. The 1993 and 1995 BRAC actions involving F-14 aircraft were exempted from the General Conformity Rule since the net air emissions were below de minimis levels established under the rule (see Section 2.2 for discussion of de minimis levels). The movement of the single squadron of F-14A aircraft to fulfill F/A-18 C/D mission requirements was also exempted from the General Conformity Rule since emissions were below de minimis. However, the net impacts on air quality of these other actions at Oceana are considered in the analysis for this action.

One additional action, the decommissioning of aging F-14 Fleet aircraft at NAS Oceana, was not previously evaluated under NEPA or the General Conformity Rule.

However, this action is included in this General Conformity analysis and in the EIS for the F/A-18 realignment. A total of 51 F-14 fleet aircraft will be decommissioned in 1998; the majority of these will be F-14A models.

As presented in Table 1-1, these separate actions will result in an increase of 70 total aircraft from 1993 levels at the station. In 1999, 343 aircraft will be based at NAS Oceana. As a result, personnel loadings at NAS Oceana will increase from approximately 10,500 military and civilian personnel in 1993 to approximately 13,700 personnel in 1999 (U.S. Navy 1995a).

Table 1-1

HISTORIC AND PROJECTED AIRCRAFT LOADING
AT NAS OCEANA<sup>a</sup>

Aircraft Type	1993 Total	1995	1996	1997	1998	1999
A-6	86	29 <sup>b</sup>	14 <sup>b</sup>	0 <sub>p</sub>	0	0
F-14A	80	79 <sup>b</sup>	93°	95 <sup>d</sup>	50 <sup>b</sup>	50
F-14B/D	55	55	69 <sup>e</sup>	103 <sup>f</sup>	97 <sup>b</sup>	97
A-4E	3	0 <sub>b</sub>	0	0	0	0
A-4F	15	O <sub>p</sub>	0	0	0	0
F-5E .	4	0 <sub>p</sub>	0	0	0	0
F-5F	1	0 <sub>p</sub>	0	0	0	0
F-16N	5	O <sub>p</sub>	0	0	0	0
F/A-18 C/D	0	12 <sup>g</sup>	12	12	132 <sup>h</sup>	192 <sup>h</sup>
UH-3H	2	2	2	0 <sub>p</sub>	0	0
TA-4J	9	O <sub>p</sub>	0	0	0	0
TC-4C	4	0 <sub>p</sub>	0	0	0	0
TF-16N	1	0 <sub>p</sub>	0	0	0	0
C-12	1	1	1	1	1	1
T-2C	4	0 <sub>p</sub>	0	0	0	0
T-34	3	3	3	3	3	3
Total	273	181	194	214	283	343

<sup>&</sup>lt;sup>a</sup> Figures as of the last day of each fiscal year (September 30).

Source: U.S. Navy 1995a.

b Decrease in aircraft resulting from decommissioning activities.

<sup>&</sup>lt;sup>C</sup> Increase of 14 F-14A aircraft associated with 1995 F-14 BRAC realignment from NAS Miramar.

d Increase of two F-14A aircraft associated with both the 1995 F-14 BRAC realignment from NAS Miramar and separate transfer of one F-14A squadron to fulfill F/A-18 mission requirements and the decommissioning of aging F-14A aircraft.

e Increase of 14 F-14D aircraft associated with 1995 F-14 BRAC realignment from NAS Miramar.

f Increase of 34 F-14D aircraft associated with 1995 F-14 BRAC realignment from NAS Miramar and 1993 BRAC realignment of F-14 FRS detachment.

g Increase of 12 F/A-18 C/D associated with commissioning new adversarial squadron at NAS Oceana.

h Increase of F/A-18 C/D aircraft associated with proposed action. Includes adversary squadron.

# 1.4 Components of the Proposed Realignment

# 1.4.1 Proposed F/A-18 Construction Projects

## F/A-18 Parking Apron Alterations

This project would include two separate components:

- The installation of 6-foot by 6-foot steel (2-meter by 2-meter) plates along the flight line in the proposed F/A-18 parking area; and
- Installation of apron 400-hertz (Hz) converters (i.e., fixed-point utility systems [FPUSs]).

Because exhaust from F/A-18 auxiliary power units projects downward, plates must be installed on top of the existing concrete flight line in the proposed F/A-18 parking area to protect the pavement from damage during aircraft engine start-ups. The Hz converters are used to provide power to aircraft parked on the apron (U.S. Navy 1995b).

# F/A-18 C/D Flight Simulator Facility

This project would consist of the construction of a two-story, 53,916-square-foot (6,726-square-meter) addition to Building 140 to accommodate F/A-18 C/D flight simulators. Currently, NAS Oceana operates F-14 flight simulators only. Excess simulator space created by the recent decommissioning of A-6 aircraft at the station is being filled by F-14D simulators which are being relocated to NAS Oceana to support 1993 BRAC directives. Additional space is required to house the incoming F/A-18 C/D flight simulators.

The addition would wrap around the northwest and southwest sides of the existing building onto existing lawn areas and a portion of an underutilized parking area. The project also involves interior modifications to Building 140 (U.S. Navy 1995b).

# Naval Maintenance Training Group Detachment (NAMTRAGRUDET) Training Facility

This project would include interior modifications and the construction of a one-story, 40,359-square-foot (3,749-square-meter) addition to Building 240 to house classroom and training space, and interior modifications to Building 223. Currently, NAMTRAGRUDET facilities at NAS Oceana are used to instruct students in the maintenance of fighter and attack aircraft. Excess space created by the recent decommissioning of A-6 aircraft at the station is not large enough to satisfy F/A-18 C/D training requirements.

The Building 240 addition would create a new wing off the southeast portion of the building, currently a maintained lawn area.

# Strike Fighter Weapons School Facilities and Parking

Three additions to Building 137, totaling 26,722 square feet (2,483 square meters), would be constructed under this project, including:

- A one-story addition to the northwest corner of the building (currently maintained lawn and parking) for inert weapons storage;
- A two-story addition to the southeast corner of the building (currently maintained lawn) for classroom space, offices, and rest rooms;
   and
- A one-story addition to the southwest corner of the building (currently maintained lawn) for a new 120-seat lecture hall.

The project would also involve the construction of a new 23,940-square-foot (2,224-square-meter), 76-space parking lot in an adjoining maintained lawn area. The construction additions and the additional parking spaces are required to alleviate projected training space shortfalls for F/A-18 C/D aircraft (U.S. Navy 1995b).

# F/A-18 C/D Aviation Maintenance Facilities and Parking

This project would involve a series of small additions and freestanding construction projects to augment facilities along the flight line. These projects include:

- Construction of a one-story, 2,820-square-foot (262-square-meter) addition to the northeast side of Building 301 (currently maintained lawn) for storage;
- Construction of two one-story additions, totaling 3,143 square feet (362 square meters) on the northeast side of Building 401 (currently a combination of maintained lawn and pavement), for a ground support equipment (GSE) shop and battery shop;
- Construction of a canopy extending from the southeast side of Building 401 for parking of GSE vehicles;
- Construction of a 4,700-square-foot (437-square-meter) freestanding shed southeast of Building 401 (currently a wooded area) for storage of "Yellow Gear" (e.g., aircraft tugs); and

- Construction of a 3,000-square-foot (279-square-meter), one-story addition to Building 513 (on maintained lawn) for a composite shop (i.e., aircraft body repair); and
- Construction of a freestanding 5,290-square-foot (491-square-meter) building east of Building 513 for armament storage.

The project would also involve construction of two new parking lots, one 40,000-square-foot (3,716-square-meter), 100-space lot that would be located in a wooded area east of Building 401, and one 44,400-square-foot (4,125-square-meter), 78-space parking lot that would be located in a currently maintained lawn area west of Building 513. The construction additions and the additional parking spaces are required to alleviate projected intermediate level maintenance shortfalls for F/A-18 C/D aircraft (U.S. Navy 1995b).

# **Corrosion Control Hangar**

The construction of a new 13,322-square-foot (1,238-square-meter) hangar facility along the paved flight line would be included in this project. This project is required to provide space to wash and strip corrosive material, and paint F/A-18 C/D aircraft at the operational maintenance level.

The proposed site is located southeast of Building 122, a former A-6 aircraft hangar that would be used for F/A-18 C/D aircraft. The project would require the removal of five temporary buildings (Buildings 132, 133, 134, 137A, and 137B) and construction of a 4,135-square-foot (384-square-meter) extension of pavement from the southeastern end of the flight line (U.S. Navy 1995b).

### **Installation of Secure Vaults**

This project would involve the installation of vaults in Buildings 111 and 122 designed to store classified documents for F/A-18 C/D squadrons and secure debriefing spaces with the hangars.

# Renovations to Building 122

This project would involve limited interior hangar renovations (e.g., installation of interior walls, utilities, etc.) to Building 122 designed for the specific requirements of F/A-18 C/D squadrons.

# **Bachelor Enlisted Quarters and Parking**

Two projects would be constructed: a new 230-room, 173,300-square-foot (16,100-square-meter) BEQ designed to house 460 enlisted E-1 through E-4 personnel and a new 55-room, 41,440-square-foot (3,850 square meter) BEQ designed to house 110 E-1 through E-4 personnel. The facilities would be located on a wooded site near the intersection of "E" Avenue and 3rd Street. These projects would also include a surface parking lot for 442 vehicles.

# **Jet Engine Testing Cell Replacement**

This project would involve the renovation of Building 1100, located at the southwestern end of the flight line, to facilitate testing of aircraft engines. It would include construction and installation of an acoustically-treated engine test enclosure, air intakes with silencers, and a structurally isolated ancillary building to house a test operator control room, fuel room, mechanical room, and rest room facilities. The project would also include demolition of an existing high-temperature exhaust silencing system and replacement through the construction of a new air-cooled augmenter.

# Aircraft Acoustical Enclosure (i.e., Hush House)

This project would involve the construction of a new 11,795-square-foot (1,096-square-meter), one-story building to conduct high-powered, in-aircraft engine run-ups. The building would be equipped with acoustical elements to reduce noise emissions associated with these activities.

# 3-Module Aircraft Hangar

This project would involve the construction of a 116,502-square-foot (10,823-square-meter), 3-module hangar along the former A-6 flight line. The facility would be designed in full compliance with P-80 guidelines and would provide space for three fleet squadrons (i.e., 36 aircraft).

# **Parking Apron Expansion**

This project would involve the construction of a 870,202-square-foot (80,844-square-meter) expansion of the aircraft parking apron along the former A-6 flight line. The expansion would be intended to provide parking space adjacent to the proposed 3-module aircraft hangar.

# 1.4.2 Aircraft Operations

Realignment to NAS Oceana would result in changes to the level of aircraft operations. Aircraft operations consist of two components:

- Airfield operations composed of landing and takeoff (LTO) cycles, touch-and-go operations, and approach/circling patterns around NAS Oceana and NALF Fentress; and
- Airspace operations consisting of training activities along military training routes (MTRs), and within various warning areas, military operating areas (MOAs), inert bombing ranges, and other special use airspace in eastern North Carolina.

The incoming aircraft would use airfield flight tracks and airspace that are similar to those currently used by existing aircraft stationed at NAS Oceana. To determine the projected annual total of aircraft operations, the Navy used the Naval Aviation Simulation Model (NASMOD). NASMOD projects operations of aircraft squadrons over a simulated year, based upon the respective training requirements and deployment cycles of each aircraft squadron examined (ATAC 1998).

The NASMOD analysis encompassed a cumulative 1999 projection of the operations of the incoming Atlantic Fleet F/A-18 C/D squadrons, Pacific Fleet F-14 squadrons (including the single F-14A squadron that will fulfill F/A-18 mission requirements), the F-14 FRS Detachment, as well as other aircraft that typically utilize NAS Oceana and NALF Fentress for aircraft operations. As discussed in Section 1.3, operations of A-6 aircraft were excluded from the analysis based on the assumption that all A-6 aircraft deployed in 1996 would be decommissioned by mid-1997 (ATAC 1998).

It should be noted that while all airfield operations at NAS Oceana and NALF Fentress were included in this analysis, projected airspace operations in eastern North Carolina were excluded from this air conformity review. Training areas in North Carolina are designated as attainment areas with no prior nonattainment designation for all criteria pollutants; therefore, emissions associated with aircraft operations in these areas are not subject to the General Conformity Rule.

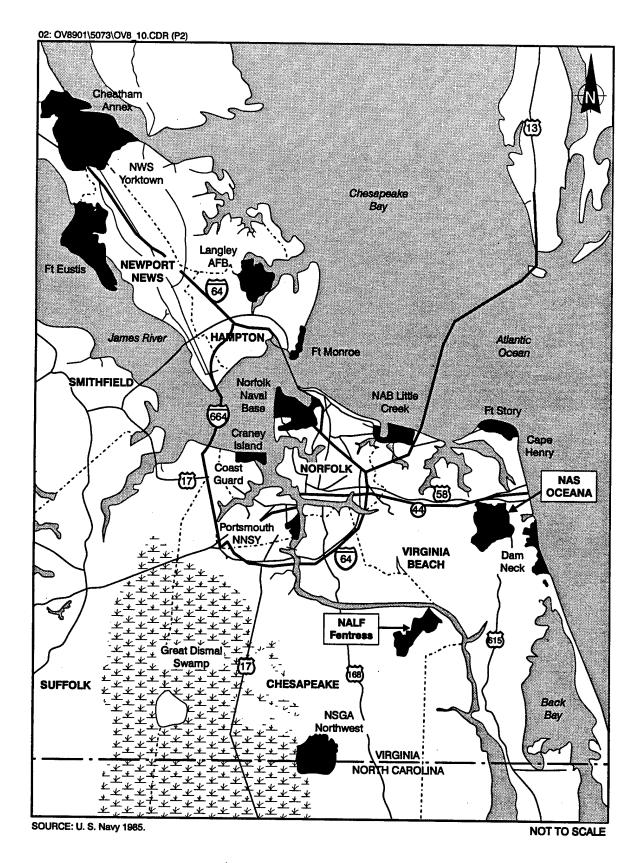
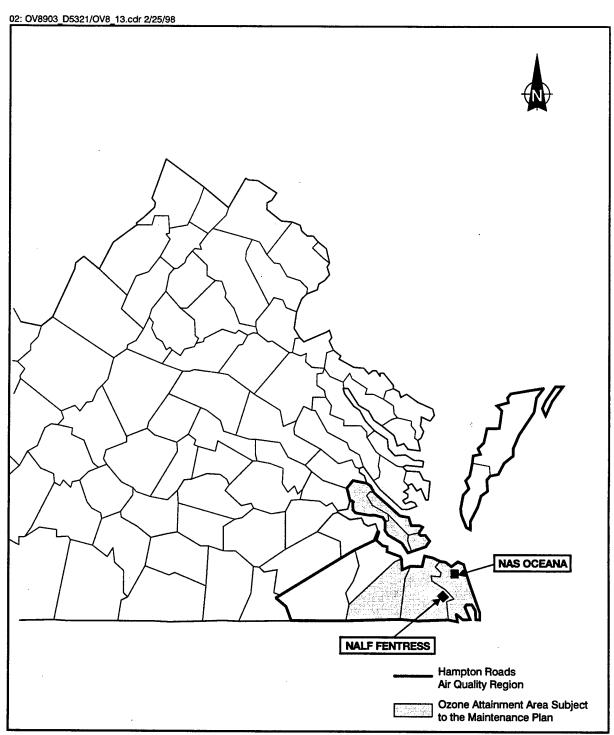


Figure 1-1 NAS OCEANA REGIONAL LOCATION

Figure 1-2 NAS OCEANA MAP



SOURCE: Virginia DEQ 1994

Figure 1-3 HAMPTON ROADS AIR QUALITY REGION

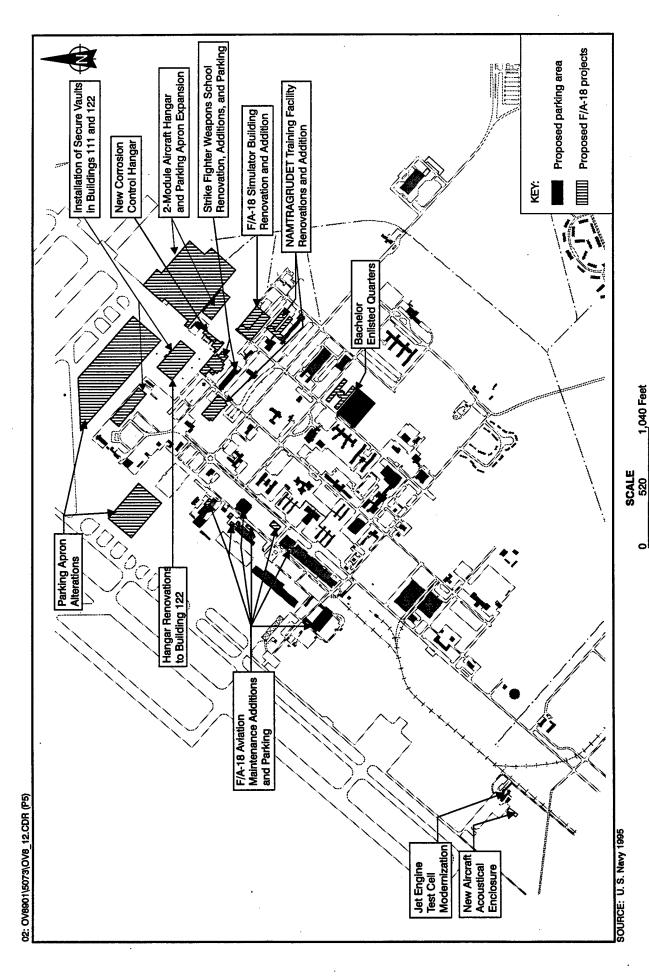


Figure 1-4 CONSTRUCTION ASSOCIATED WITH THE PROPOSED ACTION

317 Meters

158.5

# 2.1 Clean Air Act

The CAA of 1970, 42 USC 7401 et seq., amended in 1977 and 1990, is the primary federal statute governing air pollution. The CAA designates six pollutants as criteria pollutants, for which National Ambient Air Quality Standards (NAAQS) have been promulgated to protect public health and welfare. The six criteria pollutants are respirable particulate matter smaller than 10 micrometers in diameter (PM10), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), lead (Pb), and ozone (O<sub>3</sub>). The Commonwealth of Virginia has adopted these federal standards (see Table 2-1).

Federal law requires states or local air quality control agencies to have a State Implementation Plan (SIP) that prescribes measures to eliminate or reduce the severity and number of violations of NAAQS and to achieve expeditious attainment of these standards. Areas that do not meet NAAQSs are designated as "nonattainment" for that criteria pollutant. Nonattainment status is further defined by the extent the standard is exceeded. There are six classifications of ozone nonattainment status: transitional, marginal, moderate, serious, severe, and extreme; and two classifications of CO and PM10 nonattainment status: moderate and serious. The remaining criteria pollutants have designations of either attainment, nonattainment, or unclassifiable. Areas redesignated from nonattainment to attainment are commonly referred to as maintenance areas, indicating the area is in attainment but subject to an EPA-approved maintenance plan for a specific pollutant.

Although VOCs are not considered criteria pollutants and no ambient standard exists for them, VOCs are a major contributor to urban air pollution because they react to form ozone in the lower atmosphere. Nitrogen dioxide is the only nitrogen oxide (NO<sub>X</sub>) for which an ambient standard exists. However, all NO<sub>X</sub> (NO, NO<sub>2</sub>, and NO<sub>3</sub>) are considered to be ozone precursors. Therefore, VOC and NO<sub>X</sub> emission sources are regulated in order to control ozone in ozone maintenance and nonattainment areas.

NAS Oceana and NALF Fentress are located in the Hampton Roads Air Quality Control Region, which has an EPA-approved ozone maintenance plan in effect (FR, Vol. 62, Number 123, June 26, 1997). The Hampton Roads area meets all other standards (NAAQS) set for criteria pollutants without the use of a maintenance plan.

The Commonwealth of Virginia, through the Virginia Department of Environmental Quality (VDEQ), submitted and received final approval on an ozone redesignation request and two SIP revision requests. The first SIP revision is an ozone maintenance plan submitted in accordance with the CAA. The second SIP revision establishes a mobile emissions budget (also known as a motor vehicle emissions budget). The EPA approved the redesignation and SIP revision requests (FR, Volume 62, Number 123, June 26, 1997). The VDEQ used its 1993 emissions inventory as the attainment emissions budget because 1993 was one of three years of ambient ozone monitoring data upon which Virginia based its attainment demonstration. It was also the original deadline year established by EPA for marginal ozone nonattainment areas to reach attainment for ozone.

In their redesignation request and ozone maintenance plan, VDEQ submitted three years (1993-1995) of ambient monitoring data demonstrating attainment of the ozone standard and an air basin-wide attainment emission inventory corresponding to the attainment deadline (1993) established by EPA. The ozone maintenance plan and the attainment emissions budget is presented in a Federal Register announcement (Vol. 62, No. 48, March 12, 1997). EPA received a challenge to the proposed approval of the redesignation request and SIP revisions and extended the comment period to accommodate the challenge. EPA received comments and responded to them. The comments and responses and notice of final rule for the redesignation request and SIP revisions was published on June 26, 1997 (FR Vol. 62, Number 123).

An emission allotment is contained in the attainment emissions budget for NAS Oceana's projected future year emissions. Demonstration by NAS Oceana in this conformity analysis that the maximum future year emissions will be less than or equal to the allotment is used to demonstrate conformance with the SIP. By showing emissions to be less than or equal to the allotment, the base will contribute to maintaining attainment with the ozone standard and thus comply with the SIP.

# 2.2 The General Conformity Rule

The General Conformity Rule has been promulgated by EPA to ensure that the actions of federal departments or agencies conform to the applicable SIP. The rule is a statutory obligation in Section 176(c)(4) of the CAA; it was added to the CAA by the 1990 amendments. USEPA implemented Sec. 176(c)(4) by amending 40 CFR Parts 6, 51, and 93. Part 6 was amended to reference the Conformity Rule under the environmental review and consultation requirements associated with NEPA. Part 51, "Requirements for Preparation, Adoption, and Submittal of Implementation Plans," was amended to require states to revise their implementation plans to include conformity requirements. Part 93 was newly established to require federal agencies to comply with the conformity requirements as of the effective date of the requirements (January 1, 1994) and in the interim period before the states revise their implementation plans. Virginia has submitted to USEPA a SIP revision that, if approved, would incorporate the State's General Conformity Rule into the Virginia SIP. (Virginia published its General Conformity Rule in September 1996 [12 Va. Register 3620]). Because USEPA has not approved the Virginia General Conformity SIP Revision, the conformity requirement citation in this report refers to 40 CFR Part 93.

On April 26, 1994, the Navy provided a guidance document for conducting conformity reviews entitled *Draft Interim Guidance on Compliance with the Clean Air Act General Conformity Rule* (U.S. Navy 1994). This guidance summarizes provisions of the Conformity Rule, provides steps to be followed to determine applicability of the Conformity Rule to Navy actions, and sets forth procedures for making conformity determinations. The Conformity Rule requires using the latest EPA emission estimation techniques and models listed in the most recent version of *Guideline on Air Quality Models* (EPA 1986). The rule also contains reporting, public participation, and mitigation provisions.

The General Conformity Rule covers direct and indirect emissions of criteria pollutants or their precursors that are caused by a federal action, are reasonably foreseeable, and can practically be controlled by the federal agency through its continuing program responsibility.

Conformity is demonstrated if the total net emissions expected to result from a federal action in a nonattainment or maintenance area will not:

- Cause or contribute to any new violation of any NAAQS;
- Interfere with provisions in the applicable SIP for maintenance of any standard;

- Increase the frequency or severity of any existing violation; or
- Delay the timely attainment of a standard, interim emission reduction or milestone, including where applicable, emission levels specified in the applicable SIP for purposes of demonstrating reasonable further progress, attainment, or a maintenance plan.

Mitigation measures that are enforceable may be used to demonstrate conformity. Conformity can also be demonstrated by obtaining emissions offsets; however, the entire emissions increase must be offset such that the action results in no net emissions increase.

A federal action is exempt from applicability of the General Conformity Rule requirements if the action's total net emissions are below the *de minimis* levels shown in Table 2-2 and are not regionally significant (i.e., the emissions represent 10% or less of a nonattainment or maintenance area's total emission inventory of that pollutant) or are otherwise exempt per 40 CFR 93.153. Total net emissions include direct and indirect emissions from all stationary point and area sources, construction sources, and mobile sources caused by the federal action. However, there are special considerations regarding mobile-source emissions. If the action, or a portion of the action, is subject to the transportation conformity rule, that portion of the action is not subject to the General Conformity Rule.

If the total net emissions increase caused by a federal action exceeds *de minimis* levels for nonattainment pollutants or pollutants subject to a maintenance plan, then a formal conformity determination is required. Conformance with a SIP can be demonstrated by:

- Fully offsetting the emissions increase (i.e., no net increase); or
- Showing that the emissions of nonattainment or maintenance pollutants are accounted for in the air basin's emissions budget.

NATIONAL AMBIENT AIR QUALITY STANDARDSC Secondary Standard **Primary**  $(\mu g/m^3)$ Standard **Averaging Time Pollutant** 150  $\mu g/m^3$ 24-hour maximumb 150 Respirable Annual arithmetic mean  $50 \mu g/m^3$ 50 Particulate matter  $365 \mu g/m^3$ 24-hour maximum<sup>a</sup> Sulfur dioxide None 1,300 3-hour maximuma None

Annual arithmetic mean

Annual arithmetic mean

8-hour maximuma

1-hour maximuma

Arithmetic meana

1-hour maximum<sup>b</sup>

Quarterly

 $80 \mu g/m^3$ 

9 ppm

35 ppm

 $100 \ \mu g/m^3$ 

1.5  $\mu g/m^3$ 

235  $\mu g/m^3$ 

None

None

None

100

1.5

235

Table 2-1

a Not to be exceeded more than once per year.

period.

Lcad

Ozone

C Although recent ozone and fine particulate standards are approved, they are not in effect until Virginia revises its SIP. The SIP revision incorporating the new standards is not expected until after CY 1999.

b Not to be exceeded on more than an average of one day per year for a three-year

#### Key:

ppm = Parts per million.

Carbon monoxide

Nitrogen dioxide

 $\mu g/m^3$  = Micrograms per cubic meter.

Source: Virginia Department of Environmental Quality 1994.

Table 2-2						
DE MINIMIS LEVELS						
Pollutant	Tons/Year					
Ozone (volatile organic compounds or nitrogen oxides)						
Serious nonattainment areas Severe nonattainment areas	50 25					
Extreme nonattainment areas	10					
Marginal and moderate ozone nonattainment and ozone maintenance areas outside an ozone transport region	100					
Marginal and moderate nonattainment and ozone maintenance areas inside an ozone transport region						
Volatile organic compounds	50					
Nitrogen oxides	100					
Carbon monoxide						
All nonattainment and maintenance areas	100					
Sulfur dioxide or nitrogen dioxide						
All nonattainment and maintenance areas	100					
Particulate matter						
Moderate nonattainment and maintenance areas	100					
Serious nonattainment areas	70					
Lead						
All nonattainment and maintenance areas	25					

Source: 40 CFR 93.

### 2.3 Years Requiring Emission Analyses

Emission projections used in General Conformity reviews must evaluate the years of maximum direct and indirect emissions, the CAA deadline years for attaining relevant NAAQSs, and other years specifically used by the applicable SIP documents for tracking anticipated progress toward attainment and maintenance of NAAQSs.

VDEQ is using 1993 as the existing (i.e., attainment) year for its ozone maintenance plan (Sydnor 1996) to track maintenance of the ozone NAAQs. The farthest projection year is 2008 (FR, Volume 62, No. 48, Pg. 11,341).

For the conformity determination, emissions analyses were conducted for 1993 (to conform with the attainment year that VDEQ is using for its maintenance plan) and 1999 (the maximum ozone precursor emissions year). In addition, analyses were conducted for 1996, 1997, and 1998, to show the net effects associated with phasing the implementation of the proposed action (i.e., F/A-18 aircraft will be realigned during 1998 and 1999) and to account for cumulative effects of other actions being taken at the station discussed in Section 1 (e.g., other 1993 and 1995 BRAC actions, decommissioning of aircraft, and transfer of F-14A squadron to fulfill F/A-18 mission requirements).

Although some reductions to aircraft and personnel loadings are anticipated after 1999, the Navy anticipates that the emissions generated under ARS 1 in 1999 will remain unchanged until the expiration of the 10-year maintenance period in 2008.

The 1993 emissions baseline used in the conformity determination differs from the 1993 attainment inventory contained in the maintenance plan because the Navy refined its air emission calculation methodology for military aircraft operations. For purposes of demonstrating conformity, the Navy should use consistent accounting methodology in comparing future year emissions and the 1993 baseline. One method would be to prepare a future year emission estimate based on the former methodology in order to remain compatible with the original 1993 attainment inventory. Such a method would understate future year emission estimates. The Navy believes the more accurate course would be to use the current, refined methodology, and adjust the original emissions inventory to be compatible with our future year emission numbers. Consultation with the Virginia DEQ indicates that the differences between the state's 1993 attainment inventory and the Navy's 1993 baseline are not significant and do not adversely impact the maintenance plan. The Navy remains within its absolute growth allowances of 800 tpy for NO<sub>X</sub> and 200 tpy for VOCs. The maintenance plan can accommodate the VOC baseline inventory levels and growth resulting from the proposed action within existing future year maintenance budgets (VDEQ 1998).

### **Current and Projected Emissions**

The total net change in annual emissions of ozone precursor pollutants attributable to the proposed action was calculated to determine whether the federal action is exempt from the General Conformity Rule requirements.

For purposes of air conformity, the proposed action is the decommissioning of older aircraft at NAS Oceana with a resulting emission reduction and the utilization of the available emission capacity created from this decommissioning by F/A-18 C/D aircraft realigned from NAS Cecil Field. When considered in the context of historic aircraft and levels of operations, this force restructuring began in 1990 and will continue through 1999. However, as discussed in Section 2, VDEQ is using its 1993 emissions inventory as the attainment emissions budget. The Navy is using 1993 as the existing year for calculating net emissions resulting from the action because: 1) the aircraft and level of operations are representative of typical base operations; and 2) it will allow VDEQ to track emissions corresponding to the years analyzed in its maintenance plan.

Some of the capacity created by decommissioning the older aircraft at NAS Oceana has been utilized by other realignment activities as discussed in Section 1, specifically the transfer of an F-14D FRS detachment (eight aircraft) and the transfer of four F-14 squadrons (56 aircraft) under other 1993 and 1995 actions and the transfer of one F-14A squadron (14 aircraft) to fulfill F/A-18 mission requirements under a separate action. These actions were the subject of separate NEPA documentation and air conformity reviews. The remaining capacity will be utilized for the air emissions impacts associated with realignment of the F/A-18 C/D aircraft from NAS Cecil Field.

3

### 3.1 Current Emissions of Ozone Precursor Pollutants

This section discusses the existing (1993) emissions of VOCs and  $NO_x$  from all sources at NAS Oceana and NALF Fentress. A summary of 1993, along with 1996-1999, emissions is presented in Table 3-1.

### 3.1.1 Aircraft Mobile Sources

Pollutants emitted from aircraft include VOCs and NO<sub>x</sub>. Aircraft engine emission data are typically reported as hydrocarbons based on the ratio of hydrogen to carbon in the fuel burned in the engine (Navy 1996). This reporting method is not the same as reporting VOC content of the emissions because not all hydrocarbons are VOCs. However, the reverse is true; that is, all VOCs are hydrocarbons. Data presented in the literature cited for emission factors does not indicate the VOC content of aircraft engine exhaust. Therefore, to avoid an arbitrary division of aircraft engine exhaust into VOC and non-VOC components, all aircraft engine exhaust is assumed to be VOC. This also allows aircraft engine exhaust data to be summed with other sources of VOCs at NAS Oceana for analysis. Aircraft engine emissions were estimated using the methods, emission factors, time-in-mode values, and aircraft/engine model combinations contained in the Procedures of Emission Inventory Preparation Volume IV: Mobile Sources (EPA 1992) and data on aircraft emission rates from the Navy's Aircraft Environmental Support Office (Navy 1990, 1997a) and Naval Air Warfare Center (NAWC 1994). The primary data source for aircraft engine emissions (EPA 1992) contains Navy aircraft emission data referenced primarily to AESO publications. Data from the EPA document were used unless data were not available for a particular aircraft/engine combination or the data were found to be in error. Some of the data in the EPA document were not transcribed correctly from the AESO reference. In these cases, AESO data were used. Aircraft engine emission factors sources are:

- AESO and NAWC E-2/C-2 (VOC at approach and idle mode only), F-14B/D (NAWC), F/A-18, T-34, S-3 (idle only), UH-3 (climbout and approach mode only), and F-14A (VOC at idle only); and
- EPA E-2/C-2 (all pollutant and modes other than above), A-6, A-4, F-16, F-5, S-3 (all modes other than idle), UH-3 (all modes other than climbout and approach), T-2, and F-14A (all other pollutants and modes other than stated above).

				E	AISSIONS	EMISSIONS SUMMARY - NAS OCEANA FOR 1993 AND 19	ROR 19	' - NAS OCEANA AND N. FOR 1993 AND 1996-1999	AND NA 196-1999	LF FENT	AND NALF FENTRESS - ARS 96-1999	<b>S</b> 1			
			1003				<b>4</b>	(tons per year)	ar)	Mean mirrorenmerum federar of trade runs		-	1007		
Course Tune	VACCE	NO	2	çO3	DIACTO	, LUCK	, CIN		500	D14/10	7000		1221	200	77844
NAS Oceana:	3	4001	3	700	OTTAL	() A	YOU T	3	706	LIMIO	SON	<b>3</b>	3	706	FIMILO
Mobile Sources:															
Aircraft Operations	500.57	353.51	1,018.55	23.55	223.43	264.30	243.77	571.94	14.56	179.73	244.44	298.79	565.66	16.59	224 11
Total Aircraft	500.57	353.51	353.51 1,018.55	23.55	223.43	264.30	243.77	571.94	14.56	179.73	244.44		565.66	16.59	224 11
Other Mobile Sources:												1.22			
GSE	5.13	26.43	72.65	1.71	2.00	3.09	27.35	17.03	1.84	2.24	4.57	34,01	18.73	2.20	2.66
Maintenance Run-ups	71.97	165.99	131.90	5.65	46.27	30.13	131.19	65.36	3.91	48.77	31.59	197.60	85.86	5.51	66.41
Generators	0.56	68.9	1.48	0.45	0.48	0.56	68.9	1.48	0.45	0.48	0.56	689	1.48	0.45	0.48
Total Other Mobile	77.65	199.30	206.03	7.81	48.75	33.78	165.43	83.87	6.20	51.50	36.72	238.49	106.07	8.17	69.56
Stationary Sources:															
Boilers:	1.13	32.32	8.31	22.09	3.84	0.78	29.13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	3.63
						•									
Generators	0.71	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3.77	2.21
															:
Engine Test Cells	3,26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	3.71
														: : : : : : : :	:
JP-5 Fuel Handling	99'0	0.00	00.0	0.00	0.00	0.46	00'0	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
Service Station	19.35	0.00	0.00	0.00	0.00	4.46	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00
Painting	19.30	0.00	0.00	0.00	0.00	13.29	0.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00
Construction:	0.00	0.00	0.00	0.00	0.00	0.00	00'0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
								G 2/47						1	:
Total Stationary	44.41	60.88	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
Total NASO	622.64	613.70	1,260.78	54.97	278.91	320.73	469.13	695.27	46.10	238.25	307.01	624.28	726.40	53.55	303.22
NALF Fentress:															
Aircraft	13.48	146.63	37.00	6.81	30.87	7.20	145.45	19.20	6.03	39.01	7.73	175.88	19.05	6.88	47.82
				7							100000000000000000000000000000000000000				

						TOSTOR				
		EMISS	IONS SUN	IMARY-	NAS OCE	SANA ANI	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 1	CNTRESS	- ARS 1	
			-	7	FOR 1993 AND 1996-1999 (tons per year)	1993 AND 1996-1 (tons per year)	666			
			1998					1999		
Source Type	VOCs	NOx	93	S02	PM10	VOCs	NOX	00	802	PM10
NAS Oceana:										
Mobile Sources:										
Aircraft Operations	440.58	438.91	438.91 1,129.73	21.79	310.54	563.10	\$13.16	1,457.49	25.04	359.56
Total Aircraft	440.58	438.91	438.91 1,129.73	21.79	310.54	563.10	513.16	1,457.49	25.04	359.56
Other Mobile Sources:										
GSE	3.67	.34.57	17.17	2.32	2.79	3.69	34.66	17.22	1.73	1.92
Maintenance Run-ups	35.21	189.46	101.61	3.63	61.07	43.23	203.74	123.04	5.44	67.39
Generators	0.56	68.9	1.48	0.45	0.48	0.56	683	1.48	0.45	0.48
<b>Total Other Mobile</b>	39.44	230.91	120.25	6.40	64.34	47.48	245.29	141.74	7.62	69.79
Stationary Sources:										
Boilers:	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
-				• • • • • • • • • • • • • • • • • • • •						
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	9.70	\$4,02	67.01	1.81	9.72	11.95	60.64	74.65	1.99	12.03
JP-5 Fuel Handling	0.81	0.00	00.00	0.00	0.00	0.90	00'0	0.00	0.00	0.00
Service Station	6.40	0.00	0.00	0.00	0.00	6.72	0.00	00.00	0.00	0.00
Painting	34.12	000	0.00	0.00	0.00	41.00	00'0	0.00	0.00	0.00
Construction:	000	0.00	0.00	0.00	0.00	2.55	26.13	8.18	2.41	4.08
				and all the standard and the same						1
<b>Fotal Stationary</b>	53.76	109.02	80.96	28.40	15.31	65.85	141.78	82.96	30.99	21.69
Total NASO	533.78	778.85	1,330.95	56.60	390.18	676.43	900.23 1,696.02	1,696.02	63.65	451.05
NALF Fentress:							-			
Aircraft	8.50	225.66	23.90	8.36	67.22	9.35	251.06	27.23	9.19	78.26
Total Annual:	542.28	1.004.51	542.28 1.004.51 1.354.85	64.97	457.40	685.78	457.40 688.78 1.151.30 1.723.25	1.723.25	72.84	570 30

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key: VOC = volatile organic compounds. NOx = oxides of nitrogen. CO = carbon monoxide.

SO2 = sulfur dioxide.

JP-5 = jet fuel.PM10 = particulate matter. JP-5 GSE = Ground Support Equipment

Current aircraft operation data at NAS Oceana and NALF Fentress were provided by the NAS Oceana Aircraft Operations Department. Emission rates in pounds per operation were developed for each aircraft type for the following types of aircraft operations:

- Full LTO cycles, which include a check idle period for aircraft performing an initial departure from the airfield, a taxi-out/idle, a hot refueling idle mode for a percentage of aircraft performing full LTOs, takeoff, climbout, approach, and taxi-in/idle modes;
- Touch-and-go cycles, which include approach, climbout, and a level mode (i.e., low circling operation as the aircraft re-enters the touchand-go pattern). Fleet Carrier Landing Practice (FCLP) cycles are similar to tough-and-go cycles;
- The ground-controlled-approach (GCA) pattern box, involving a circling level pattern between NAS Oceana and NALF Fentress, without significant altitude changes (i.e., no approach or climbout mode); and
- Interfacility operations between NAS Oceana and NALF Fentress, which include only a level mode.

As shown in Table 3-1, the combined aircraft emissions from both facilities for VOCs and NO<sub>x</sub> in 1993 were 514 and 500 tons per year, respectively. A detailed description of the methods used to estimate aircraft emissions is presented in Appendix A.

### 3.1.2 Other Mobile Sources

A series of other mobile sources at NAS Oceana contribute to air emissions at the station. These include GSE, engine maintenance run-ups (in-frame engine testing), and mobile generators.

GSE, also known as yellow gear, includes various vehicles and equipment used along the flight line to support aircraft and operations, such as tow tractors, jet engine start units, and service vehicles. Existing emissions for GSE were calculated based upon existing operations and fuel logs. The 1993 emissions of VOCs and NO<sub>x</sub> from GSE were 5 tons and 26 tons, respectively. In-aircraft engine maintenance run-ups are performed as necessary after engine maintenance events. The tests involve running the engine at various power settings and durations. Maintenance run-ups accounted for 72 tons of VOC emissions and 166 tons of NO<sub>x</sub> emissions in 1993.

Mobile generators include portable diesel units used to power essential buildings in cases of emergency electrical outages or other situations when power is not available.

Emissions for these units were calculated using data from past operations and fuel logs. Mobile generators emitted 0.6 ton of VOCs and 7 tons of  $NO_x$  in 1993.

NAS Oceana employees commuting to and from the base in personally owned vehicles (POVs), as well as government-owned vehicles operating on and off base, are sources of air emissions. However, emissions from POVs and government-owned vehicles are not included in this analysis because they have already been accounted for in the Hampton Roads Transportation Improvement Program (TIP). A final Transportation Conformity Determination for this TIP was completed in December 1995 (ICF Kaiser 1995). A memorandum discussing this incorporation into the Transportation Conformity Determination is included as Appendix D. Therefore, this portion of the action is presumed to conform to the Virginia SIP and is not included in this conformity determination.

### 3.1.3 Stationary Sources

Stationary sources at NAS Oceana include boilers, generators, jet fuel storage tanks, paint spray operations, the Navy Exchange (NEX) service station, and engine test cells (out of frame engine testing). These emissions were calculated through an examination of operations logs and fuel usage data provided by the NAS Oceana Environmental Compliance Division.

The total emissions of VOCs and NO<sub>x</sub> from stationary sources for 1993 were estimated to be 44 and 61 tons per year, respectively. The methods and assumptions used to calculate stationary source emissions are shown in Appendix A. Ecology and Environment, Inc., (E & E)

### 3.2 Projected Emissions of Ozone Precursor Pollutants

The types of aircraft stationed at NAS Oceana in 1999 (predominantly F-14 and F/A-18 C/D) would vary from 1993 (predominantly A-6 and F-14). The number of LTOs and touch-and-go operations at NAS Oceana and NALF Fentress would also vary. The number of employees at NAS Oceana would increase by approximately 2,000 from 1993 to 1999. Because of the increased number of aircraft and employees, it is anticipated that some of the associated stationary source emissions would also increase slightly due to the operation of newly constructed facilities. These new facilities can be heated by existing boiler plants at slightly increased load. Some facilities, such as the AIMD facility, simply add new emissions to the base total. The following paragraphs discuss the projected net change in emissions from all sources as a result of implementation of the proposed action. Emission summaries for the years affected by the proposed action (1996-1999) are presented in Table 3-1.

### 3.2.1 Aircraft Mobile Sources

Aircraft engine emissions are the primary emissions associated with NAS Oceana and NALF Fentress. The majority of aircraft stationed at NAS Oceana after implementation of the proposed action would be F-14s and F/A-18s C/D. Aircraft engine emissions for 1999 were estimated using the same methods as 1993, except that the number of aircraft operations were calculated using NASMOD (ATAC 1998). NASMOD provided the number of operations per specific operation type for each aircraft type.

The projected emission rates of ozone precursor pollutants in 1999 for aircraft are 563 tons per year of VOCs and 513 tons per year of NO<sub>x</sub> from NAS Oceana, and 9 tons per year of VOCs and 251 tons per year of NO<sub>x</sub> from NALF Fentress. The combined 1999 aircraft emissions from both facilities would be 572 tons per year of VOCs and 764 tons per year of NO<sub>x</sub>.

### 3.2.2 Other Mobile Sources

Other mobile emission sources include GSE, engine maintenance run-ups (in-frame engine testing), and mobile generators. Projected emissions from GSE were based on estimates of fuel used by GSE multiplied by the projected amount of GSE used during a specific year (NAS Oceana 1997). The projected number of maintenance run-up events by aircraft type was taken from the noise study database (Wyle Labs 1997). Mobile electrical generator emissions were projected based on the fuel usage derived from past operations logs. Projected VOC and NO<sub>x</sub> emissions from GSE in 1999 would be 4 and 35 tons per year,

respectively. Projected VOC and  $NO_x$  emissions from engine maintenance run-ups in 1999 would be 43 and 204 tons per year, respectively. Mobile electrical generators are projected to emit 0.6 ton of VOCs and 7 tons of  $NO_x$  in 1999.

### 3.2.3 Stationary Sources

Projected emissions from stationary sources were calculated using data for anticipated changes in the level of use of existing sources and data for any new stationary sources (i.e., the new corrosion control [painting] hangar). These emissions are divided into six primary source categories: boilers, generators, out-of-frame engine test cells, fuel storage tanks, the NEX service station, and painting operations.

The total emissions of ozone precursor pollutants from stationary sources in 1999 are projected to be 66 tons per year of VOCs and 142 tons per year of  $NO_x$ .

### 3.2.4 Construction

The construction projects associated with the proposed action would result in the emission of ozone precursor pollutants to the atmosphere. These consist of exhaust and crankcase emissions from construction machinery. An estimated 2.6 tons of VOCs and 26.1 tons of  $NO_x$  would be emitted from all construction projects (see Appendix A). These air quality impacts would be limited to the construction phase of the proposed action (1999).

### 3.3 Net Change in Emission of Ozone Precursor Pollutants

Table 3-2 presents a summary of net emissions from NAS Oceana and NALF Fentress between 1993 and 1999. As shown on Table 3-2, the VOC emissions from NAS Oceana and NALF Fentress would increase from 1993 to 1999. Annual VOC emissions would increase by 50 tons per year. This increase is primarily a result of increased aircraft operations and VOC emissions from the AIMD facility. Annual NO<sub>x</sub> emissions would increase by 391 tons per year, primarily resulting from increased aircraft operations, maintenance run-ups, and higher NO<sub>x</sub> emission rates for incoming aircraft (i.e., F/A-18 vs. A-6). The increase in NO<sub>x</sub> emissions exceeds the General Conformity Rule *de minimis* exemption level of 100 tons per year. The increase in VOC emissions does not exceed the General Conformity Rule *de minimis* exemption level. Although not required for VOCs, a full conformity determination has been performed for both pollutants to be consistent with the format of the draft conformity determination and to account for a refined Navy emissions calculation methodology, which resulted in a difference between the 1993 baseline calculations of the Navy and those of the state.

		Table 3-2			
NET EMISSIONS CHANGE - NAS OCEANA AND NALF FENTRESS - ARS	S CHANGE - N	AS OCEANA A	IND NALF FE	NTRESS - ARS	1
		(tons per year)			
Year	VOCs	XON	00	802	PM10
NAS Oceana:					
1993	622.64	613.70	1260.78	54.97	278.91
9661	320.73	469.13	695.27	46.10	238.25
1997	307.01	624.28	726.40	53.55	303.22
8661	533.78	778.85	1330.95	56.60	390.18
1999	676.43	900.23	1696.02	63.65	451.05
Net Change:					
1993 to 1999	53.79	286.53	435.23	8.68	172.14
NALF Fentress:					
1993	13.48	146.63	37.00	6.81	30.87
1996	-7.20	145.45	19.20	6.03	39.01
1997	7.73	175.88	19.05	6.88	47.82
1998	8.50	225.66	23.90	8.36	67.22
1999	9.35	251.06	27.23	9.19	78.26
Net Change:					
1993 to 1999	-4:13	104.43	-9.77	2.39	47.39
Net Change NAS Oceana and NALF Fentress:					
1993 to 1999	49.66	390,96	425.47	11.06	219.52

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

02/17/98

# Demonstration of Conformity with the Virginia SIP

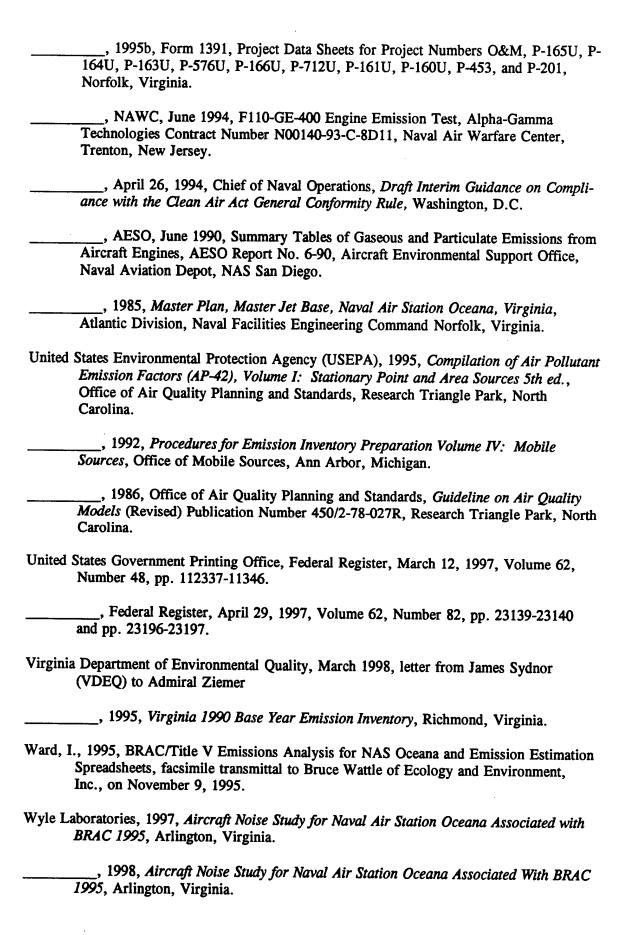
The net emissions of  $NO_x$  associated with the proposed action exceed the *de minimis* exemption level for maintenance areas stipulated in the General Conformity Rule.  $NO_x$  emissions are projected to increase by 391 tons per year in 1999, exceeding the *de minimis* level by 291 tons per year. VOC emissions are projected to increase by 50 tons per year in 1999. This net increase is 50 tons below the *de minimis* level.

As discussed in Section 2, the Commonwealth of Virginia has submitted and received EPA approval on an ozone redesignation request, a maintenance plan SIP revision, and a mobile emissions budget (also known as a motor vehicle emissions budget) SIP revision. To demonstrate conformity with the Virginia SIP as revised, the Navy coordinated with VDEQ to incorporate the projected net emissions associated with the proposed action into Virginia's ozone maintenance plan. The VDEQ emissions budget in the Maintenance Plan SIP revision contains a growth allotment of 200 tons per year of VOCs and 800 tons per year of NO<sub>x</sub> for NAS Oceana/Fentress (FR, Volume 62, No. 48; Sydnor 1996). The projected maximum net emissions in the full build-out year (1999) of 50 tons per year of VOC and 391 tons per year of NO<sub>x</sub> are within the allotments. Therefore, conformity with the SIP is demonstrated. This approach satisfies the criteria for determining conformity of general federal actions as specified in 40 CFR 93.158(a)(1).

4

5 References

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# Α

# **Methods of Analysis**

### A.1 Aircraft Emissions Analysis

This section describes the methods and assumptions used to estimate the air pollutant emissions from aircraft operations at NAS Oceana and NALF Fentress. The aircraft emissions analysis was conducted in two phases: emission rates were developed for each type of aircraft, and the number and type of operations were estimated for each aircraft type.

### A.1.1 Developing Emission Rates

An aircraft engine emits air pollutants during all phases (or modes) of operation, whether idling on the ground, or in flight. However, only those pollutants emitted in the atmospheric layer known as the mixing layer affect the ground-level ambient concentrations of those pollutants. The mixing layer is generally referred to as the air layer between the ground and a height where vertical mixing of pollutants decreases significantly.

Aircraft operations which emit pollutants within the mixing layer include:

- Full LTO cycles, which may include a check idle period for aircraft performing an initial departure from the airfield, a taxi out/idle, takeoff, climbout, approach, taxi in/idle modes, and a period of idling during refueling known as "hot refueling". The taxi out/idle and taxi in/idle modes include engine RPM increases typically performed prior to flight. For the F/A-18, an on-aircraft auxiliary power unit (APU) is used prior to engine start to power aircraft systems. Emissions from APU operation are also included in full LTO cycles associated with initial departure from the airfield;
- Touch-and-go operations (T&G), which include only approach, climbout, and level modes (i.e, low circling operation as the aircraft re-enters the T&G pattern). FCLP operations were considered the same as T&G operations in this analysis since aircraft modes are similar to T&G;
- GCA box operations, which involve low-altitude circling patterns and include only a level mode; and
- Interfacility operations between NAS Oceana and NALF Fentress, which include only a level mode.

Specific pollutant emission rates are associated with each operating mode. To calculate total emissions for operation of a specific aircraft, emission rates for each operating mode are be used. Total emissions per aircraft, pollutant and operating cycle were calculated using the following equation contained in the *Procedures of Emission Inventory Preparation Volume IV: Mobile Sources* (EPA 1992):

where:

 $E_{ij}$  = total emissions of pollutant i produced by aircraft type j per LTO (or T&G/FCLP) cycle (lbs).

 $TIM_{ik}$  = time in mode for mode k for aircraft type j (minutes).

 $FF_{jk}^{jk}$  = fuel flow for mode k for each engine used on aircraft type j (lbs fuel/minute).

 $EI_{ijk}$  = emission index for pollutant i in mode k for aircraft type j (lb/10<sup>3</sup> lbs fuel).

 $NE_i$  = number of engines used on aircraft j.

Modal emission rates for most of the military aircraft engine types used at NAS Oceana were available in the aforementioned document. However, the F-14 data in this document were based on the F-14A engine (TF30-P-412A). Modal emission rate data for the F-14B and D engines (F110-GE-400) were provided by the Aircraft Environmental Support Office (AESO). AESO also provided emission rates for the level portions of touch-and-go, GCA Box, and interfacility flight operations for F-14A, B and D, A-6, F/A-18 C/D, and E-2/C-2 aircraft. For all other aircraft that perform touch-and-go operations, it was assumed that emission rates for the level mode were equivalent to the emission rates during approach for each particular aircraft. Actual flight data were provided by AESO for F/A-18 C/D approach-mode engine thrust settings. In addition, AESO provided errata for the emission rate data prepared by EPA (EPA 1992), specifically involving emission factors for Navy aircraft incorrectly transcribed in EPA publications.

Emission factors for aircraft engines are usually reported as hydrocarbons (HC) in the form  $CH_{y/x}$ , where y/x is the ratio of hydrogen to carbon in the fuel used to run the engine (Navy 1990). This way of reporting emissions presents complications when attempting to add aircraft engine emissions with other emissions from sources on base reported as VOCs. Only limited data exists to allow determination of which VOC species are in the exhaust. Therefore, to simplify the analysis while remaining conservative, all aircraft engine emissions are assumed composed of VOCs.

Time-in-mode (TIM) data for aircraft operations at NAS Oceana and NALF Fentress were based on default values for U.S. Navy Combat Aircraft, transport-turbine aircraft, and military helicopters for all modes except taxi and idle (EPA 1992). These default TIMs for climbout and approach are based on a mixing height of 3,000 feet. The climbout and approach TIMs for NAS Oceana flight operations were modified based on the local-mixing height. Site-specific TIM for taxi out/idle, taxi in/idle, hot refueling idle, and check idle were used instead of EPA default values. Site-specific TIMs were provided by NAS Oceana (Miller 1997; ATAC 1998; Navy 1998).

For this analysis, a mixing layer height of 2,500 feet was derived from EPA's published isopleth maps of mixing heights across the U.S. (EPA 1992). This revised mixing layer height is used to modify the TIM for the climb out and approach portions of aircraft flight. TIM would decrease if the mixing layer height is below 3,000 ft.

For example, the TIM for SC Approach was adjusted to reflect local mixing height using Equation 5.9, page 189, of EPA-450:

$$TIM_{ann-M} = (default TIM X (H/3000))$$
 (Eq. A-2)

where:

TIM<sub>app-M</sub> = is the adjusted time in the approach mode for military aircraft, in minutes.

default TIM = is the default time in mode value from EPA-450, Table 5-1, page 141 (example: 1.6 minutes for USN combat aircraft).

H = is the mixing height, reflecting local conditions (2,500 feet for NAS Oceana).

3,000 = is the EPA default value for mixing height, in feet.

Therefore,  $TIM_{app-M} = (1.6) \times (2,500/3,000) = 1.33$  minutes for the approach mode for USN Combat aircraft at NAS Oceana.

The TIM for SC Climbout was adjusted to reflect local mixing height using Equation 5.10, page 189, of EPA-450:

$$TIM_{clim-M} = (default \ TIM) \ X \ [(H-500)/2500]$$
 (Eq. A-3)

where:

TIM<sub>clim-M</sub> = is the adjusted time in the climbout mode for military aircraft, in minutes.

default TIM = is the default time in mode value from EPA-450, Table 5-1, page 141 (example: 0.5 minutes for USN Combat aircraft).

H = is the mixing height, reflecting local conditions (2,500 feet for NAS Oceana).

Therefore,  $TIM_{clim-M} = (0.5) X [(2,500-500)/2,500] = 0.4$  minutes for the approach mode for USN Combat aircraft at NAS Oceana.

Climbout and approach TIMs were adjusted to 2,500 feet by reducing them by 17%. TIMs for level modes of touch-and-go, GCA Box, and interfacility flight operations were estimated from flight track profiles provided by Wyle Laboratories in aircraft noise studies for NAS Oceana.

Projected aircraft operations at NAS Oceana and NALF Fentress are presented in Table A-1. Emission rates for each type of aircraft that conducted operations at NAS Oceana or NALF Fentress in 1993 and aircraft projected to conduct operations in 1999 are shown in Table A-2. In addition, emission rates in pounds per mode were tabulated for full cycle LTOs (with or without hot refueling), touch-and-go/FCLP operations, GCA Box operations, and interfacility level-mode operations.

### A.1.2 Aircraft Operations

After aircraft emission rates were developed, the number and types of operations which occurred or will occur in the years of interest were determined. Data for the baseline year (1993) were derived from air traffic control records for both NAS Oceana and NALF Fentress. The number of operations projected for 1997 and 1999 was taken from the Naval Aviation Simulation Model (NASMOD), which provided the number of operations for specific operation types for F-14A, F-14B/D, and F/A-18 C/D (ATAC 1998). Because the number of operations in 1996 and 1998 were not modeled by NASMOD, they were estimated by proportioning 1997 and 1999 data according to the number of aircraft stationed at NAS Oceana during those years. For 1996 and 1998, it was assumed that the number of operations for T-34s, S-3s, C-12s, and E-2/C-2s (NALF Fentress only) would be the same as 1999 because the number of these types of aircraft used at NAS Oceana would not change.

NASMOD data distinguish between full-cycle LTOs and touch-and-gos; 1996 and 1998 data were proportioned accordingly. Only E-2/C-2 aircraft are permitted to conduct full-stop landings at NALF Fentress; A-6, F-14, and F/A-18 C/D aircraft are permitted to perform only touch-and-go operations (FCLPs included) at NALF Fentress. Therefore, all operations at NALF Fentress, with the exception of E-2/C-2s, were assumed to be touch-and-gos.

The NASMOD analysis counts operations differently than required for air pollutant emission analyses. In the air quality analysis, emissions are calculated for a full LTO cycle, which consists of various idling modes, taxiing, takeoff, climbout, and approach. In NASMOD, departures are counted separately from landings; each is counted as one operation. Generally, the number of departures equals the number of landings, therefore, either is indicative of the number of full LTO cycles at the airfield (assuming each aircraft that performs a landing will also perform a departure at a later time). For the emissions analysis, the number of departures was used as the number of LTOs.

A full LTO may be performed with or without hot refueling. Hot refueling is a period of time during which aircraft are refueled while the engines are in idle mode. Only

F-14A, F-14B/D, F/A-18 C/D, A-6, and S-3 aircraft are capable of hot refueling. Because facilities for hot refueling are limited, only 25% of the full LTO operations perform hot refueling. The remainder (75%) refuel under engine shut-down conditions (Miller 1997). A full LTO with hot refueling includes emissions from the following operating modes: taxi out/idle, takeoff, climbout, approach, taxi in/idle, and hot refueling idle.

A full LTO without hot refueling is assumed to be an initial departure of an aircraft from the airfield after a period of shutdown. To prepare the aircraft for flight, APU use and/or engine check idle operation is required. These operations generate emissions. A full LTO without hot refueling includes emissions from the following: APU use (F/A-18 C/D only), engine check idle, taxi out/idle, takeoff, climbout, approach, and taxi in/idle.

In the air quality analysis, T&G and FCLP is counted as one operation consisting of an approach and climbout mode. Level modes of flight during the circling pattern to repeat a T&G or FCLP are analyzed separately. In NASMOD, a T&G and FCLP is counted as two operations. Therefore, T&G and FCLP NASMOD data were divided by two to obtain the data required for the air quality analysis.

The number of operations per year for each aircraft type was multiplied by the appropriate emission factors to determine an annual emission rate for each aircraft type. A summary of aircraft emissions from NAS Oceana for 1993, 1996, 1997, 1998, and 1999 is presented in Table A-3. A summary of aircraft emissions from NALF Fentress for the same years is presented in Table A-4.

### A.1.3 Example Aircraft Emission Calculation

In summary, the procedure used to calculate emissions from aircraft flight operations consists of the following steps:

- Obtain modal emission rate from best available reference.
- Use appropriate TIMs for all modes. Modify TIMs for climbout and approach using local mixing layer height and equations A-2 and A-3 presented in Section A.1-1.
- Determine total emissions per aircraft, pollutant and operating cycle using equation A-1.
- Determine total emissions of pollutant from aircraft operations using:

$$E_{Ti} = \sum J_i C E_{ij} * A$$

### where:

E<sub>ti</sub> = total annual emissions from aircraft flight operations of pollutant i. E<sub>ij</sub> = total emissions of pollutant; from aircraft types per operating cycle c.
A = number of operations of type c.

 $i = pollutants HC, NO_x, CO, SO_2, PM_{10}$ .

j = aircraft types listed in Table A-1.

c = LTO without hot refueling, LTO with hot refueling, T&G (including FCLP), and level flight modes (GCA box pattern, interfacility, and T&G level mode).

### A.2 Other Mobile Sources

### A.2.1 Ground Support Equipment

GSE emissions were calculated by determining the average amount of fuel used for each GSE based on a review of equipment and fuel logs. Data regarding future fuel usage and the projected amount of GSE to be used in a specific year were provided by NAS Oceana (NAS Oceana 1997). Emission factors for uncontrolled gasoline and diesel industrial engines from the Compilation of Air Pollutant Emission Factors (AP-42), Volume I: Stationary, Point, and Area Sources (EPA 1995) were applied to the fuel usage data to calculate emissions from GSE.

Emissions factors, fuel consumption data, and annual emission rates for GSE are shown in Table A-5.

### A.2.2 In-Aircraft Maintenance Run-ups

In-aircraft (or in-frame) engine testing is performed on a routine basis at NAS Oceana at designated areas. These operations are known as maintenance run-ups because their purpose is to perform routine maintenance checks, evaluate pilot reports of abnormal operation and to test engines prior to and following test cell procedures. During maintenance run-ups, each engine is tested under specific power settings that correspond to typical operating modes (i.e., idle, takeoff, climbout, and approach). Emission rates per run-up power setting were calculated by multiplying the time in each power setting by the appropriate fuel flow and the emission factors found in Procedures for Emission Inventory Preparation Volume IV: Mobile Sources (EPA 1992). These emission rates are presented in Table A-6. The emission rates are multiplied by the number of run-ups per year for each power setting for each engine to estimate the annual emissions from maintenance run-ups (see Table A-7). The existing number of single-engine maintenance run-ups, power settings, and duration in each power setting were compiled from squadron and maintenance crew interviews and logs. The projected number of single-engine maintenance run-ups was obtained from noise studies (Wyle Labs 1997). Emissions of VOCs, NO<sub>x</sub>, CO, SO<sub>2</sub>, and PM10 generated by maintenance run-ups were calculated in the same manner as in-flight aircraft operations, as detailed in Section A.1.

### A.2.3 Mobile Generators

Mobile generator emissions were calculated based upon the average maximum hours of usage per unit. The average maximum use was derived from past operations logs and then

multiplied by the reported amount of fuel used by each unit (in gallons). The same AP-42 emission factors that were used for GSE were applied to the fuel usage for mobile generators to calculate emissions.

### A.3 Stationary Sources

There are six major categories of stationary sources at NAS Oceana: boilers, generators, engine test cells, fuel storage tanks, painting, and the NEX service station (see Figure A-1).

Sources of data used to estimate stationary source emissions included: spreadsheets developed by the NAS Oceana Environmental Compliance Division (Ward 1995) for tracking fuel usage and emissions data for boilers, diesel generators, the engine test cells, fuel storage tanks (based on vehicle and aircraft refueling), and painting operations; emission rates for boilers, generators, and fuel storage tanks published in the Compilation of Air Pollutant Emission Factors (AP-42), Volume I: Stationary Point and Area Sources (EPA 1995); the projected number of aircraft stationed at NAS Oceana in the years of interest (ATAC 1998); and the projected number of test cell operations (Wyle Labs 1997). The stationary source emissions are presented in Table A-8.

### A.3.1 Boilers

Boiler emissions were estimated by applying the appropriate AP-42 emission factors to fuel usage data. The largest and most widely used boilers at NAS Oceana are those at the main boiler plant, which have maximum rated capacities of 70 MM Btu/hr. These are small industrial boilers that burn No. 4 fuel oil and natural gas. Other boilers at NAS Oceana burn a combination of No. 2 fuel oil and natural gas.

### A.3.2 Generators

Stationary generator emissions were calculated according to fuel logs. Projected emissions from these sources were derived from the highest annual emission rates reported in previous years examined. The emission factors were the same as those used for mobile generators.

### A.3.3 Fuel Handling

Projected jet fuel (JP-5) storage tank emissions were calculated by deriving data from filling logs and estimating VOCs emitted during fuel transfer to and from tank trucks and aircraft.

To accomplish this, the AP-42 emission factors for submerged and splash loading loss for tank trucks and rail tank cars were applied to the total annual JP-5 throughput associated with fuel transfer operations, estimated through review of fuel logs.

### A.3.4 Jet Engine Test Cell Emissions

The four jet engine test cells at NAS Oceana are used to identify the maintenance needs of an engine and to verify that the engine has been restored to proper working condition prior to reinstallation into aircraft. During testing, each engine is operated under various power settings that approximate typical operating modes such as the idle, takeoff, climbout, and approach.

Estimates of power settings and durations for engine tests, as well as the number and type performed each year, were provided by NAS Oceana (Navy 1997b). These data were provided for F-14A, F-14B/D, and F/A-18 aircraft. Engine testing for A-6 aircraft was assumed to be performed in power settings analogous to those used when testing the F-14A engines and of the same duration.

Using these data, the emissions from engine testing at NAS Oceana were calculated as follows. Emission rates in pounds per test for VOCs, NO<sub>x</sub>, CO, SO<sub>2</sub>, and PM<sub>10</sub> were calculated using appropriate fuel flows, the time spent in each power setting, and emission factors. The emissions at various power settings were obtained from the *Procedures for Emission Inventory Preparation Volume IV*: *Mobile Sources* (EPA 1992); AESO Report No. 6-90 (Navy 1990); and an Navy 1997 technical memorandum (Navy 1997). The equation shown in Section A.1.1 for calculating aircraft emission rates was applied to these variables to calculate engine test emission rates. The number of engines was always one because aircraft engines are tested one at a time. In addition, the fuel used per test cycle was calculated using time in power setting, fuel flow, and fuel density (6.8 lbs/gallon for JP-5). The emission rates and fuel usage per test cycle for aircraft engines are presented in Table A-9. Only the engines used in the F-14A (TF-30-P-412A), F-14B/D (F110-GE-400), A-6 (J-52-P-8B), and F/A-18 (F404-GE-400) were considered because they are the primary aircraft stationed and serviced at NAS Oceana. Emissions produced during test cell events are presented in Table A-10.

### A.3.5 Service Stations

NEX service station fuel throughput was calculated based on the number of personal vehicles on station for the years in question. NAS Oceana operates three service stations; two are operated by the Navy Exchange, and one is operated by the Public Works Center. Emission factors from AP-42 for filling and breathing loss from gasoline retail operations and displacement and spillage loss for vehicle gasoline tanks were applied to service stations' throughput to calculate VOC emissions. These calculations also include emission reductions

associated with Stage II vapor recovery equipment installed at the service stations in 1995 and 1996.

### A.3.6 Painting Operations

Data on the types and quantities of paints used at NAS Oceana, along with the VOC content (pounds per gallon) of each paint, were obtained from base records. The VOC emissions from painting for a given year were calculated by multiplying the total gallons of each type of paint used by the respective VOC content. The primary assumption was that 100% of the VOCs contained in the paint evaporate while the paint is drying. For 1996 through 1998, the quantities of paint used annually were estimated using the number of aircraft projected to be based at NAS Oceana and the painting requirements of each type of aircraft. The 1999 VOC emissions resulting from painting correspond to the VOC emission estimate developed to support the air permit application for the new AIMD facility (Navy 1997c).

### A.4 Construction Emissions

Construction projects fall into two general categories: automobile parking lot/aircraft apron and new building/building additions. Emissions are produced in each category from construction equipment exhaust emissions during site preparation and construction/paving activities. Fugitive particulate matter is generated during the disturbance of soil, removal of existing structures/obstructions and construction.

Emissions are estimated for these activities using equipment exhaust emission factors, fugitive dust emission factors, and best engineering estimates of the duration of construction and the number and type of equipment used.

### A.4.1 Project Schedule Estimation

Construction duration was based on typical durations for similar types of structures or projects. A work day is assumed to be 8 hours long, during which the equipment operates continuously. All construction projects were assumed to occur in CY 1999.

Since all projects occur in 1999 and only annual emission estimates are required, construction schedule estimates for all individual projects were summed to produce a total estimate of equipment type, quantity, and duration of use. Equipment for construction of the automobile parking lot, aircraft apron, new building, and building addition and the duration of activity estimates are shown in Table A-11.

## A.4.2 Truck and Machinery Exhaust Emission Estimates

Heavy equipment is used to prepare a site for construction of parking lots, aircraft parking aprons, new buildings and additions to existing buildings. Activities such as excavation, grading and soil compacting occur during site preparation. Heavy equipment is also used during the construction phase of the project. Pavers, rollers and haul trucks are typically used during parking lot and aircraft apron construction; cranes, hi-lifts, and frontend loaders are typical of heavy equipment used during building construction.

Exhaust and crankcase emissions from heavy-duty construction equipment were estimated by calculating the amount of fuel burned and applying an appropriate emission factor. Emissions from haul trucks (dump trucks and cement mixers) were calculated by estimating the amount of miles driven and hours idling each work day and applying the appropriate emission factors. Emission factors for heavy construction equipment were obtained from *Procedures for Emission Inventory Preparation*, Volume IV: Mobile Sources (USEPA 1992) and Nonroad Engine and Vehicle Emission Study Report (USEPA 1991).

These emission factors are shown in Table A-11. The analysis assumes each piece of construction equipment burns an average of 50 gallons of diesel fuel per day.

The annual emission estimate is a sum of the individual emissions from each piece of heavy equipment. Equipment emissions were calculated using:

Emissions (tons/year) = 
$$\frac{((Daily fuel use * days used)/1,000) * Equip quantity * EFactor}{2,000 lb/ton}$$

Similarly, engine exhaust emissions from haul truck activity were calculated using the following equation, assuming each truck is driven 100 miles/day and idled 2 hours/day:

Emissions (tons/year) = 
$$\frac{\text{(Daily miles driven * days used * number of trucks * EFactor)}}{\text{(454 g/lb * 2,000 lb/ton)}}$$

### A.4.3 Fugitive Dust (Particulate) Emissions

Fugitive dust is emitted from mechanical disturbance of soil during site preparation and mechanical disturbance of other particulate producing materials such as construction debris during demolition.

Emission of fugitive dust due to demolition was calculated using an estimate of floor space demolished multiplied by an appropriate particulate emission factor. The amount of floor space demolished in preparation for all construction projects under each ARS was estimated to be 10% of total floor space constructed from all projects. Emission of fugitive dust due to site preparation was calculated using an estimate of the total construction projects' "footprint" plus additional disturbed area for equipment use. A project's footprint was determined by dividing the total floor space constructed by the number of floors. A multiplication factor of 2 was used to estimated the additional disturbed area for equipment use. Emission factors for fugitive dust were obtained from the Fugitive Dust Background and

Technical Information Document For Best Available Control Measures Document (USEPA 1992).

During the demolition phase, dust is emitted from structure and debris removal and vehicle activity. For demolition activity, the following equation was used to calculate annual emissions:

```
Emissions (tons/year) = (Floor space * EFactor for structure removal)
+(Floor space * EFactor for debris removal)
+(Floor space * EFactor for on-site vehicle activity)
```

Annual demolition particulate emissions are shown in Table A-12.

During site preparation, dust is emitted during bulldozing, soil removal and earthmoving activity. The following equation was used to calculate annual emissions:

```
Emissions (tons/year) = (Hours bulldozing per day * days active * EFactor)
+ (Miles travelled during soil removal per acre * Acres * EFactor)
+ (Miles travelled during soil removal * 3 (distance factor) * EFactor)
```

Assumptions for the analysis of site preparation dust are: 8 hours per day of bulldozing activity, 0.79 miles travelled per acre of soil removal (based on an average pan scraper speed of 5 MPH, pan width of 10 feet and length of one side of a square acre of 209 feet), and earthmoving miles travelled of three times soil removal miles to account for transport of soil to and from a holding area.

Annual site preparation particulate emissions are shown in Table A-12.

Total annual emissions for each pollutant emitted from each construction project were summed to produce the results presented in Table A-13.

			Table A-1			
			ARS 1			
T	OTAL AIRCRAFT	<b>OPERATION</b>	NS AT NAS OC	EANA AND N	ALF FENTRE	SS
			993 AND 1996-			
Aircraft Type	Operation type	1993	1996	1997	1998	1999
F-14A	Full LTO	12,465	9,621	9,828	6,900	6,900
	Touch&Go NASO	15,236	12,331	12,596	10,203	10,203
	GCA Box	2,178	1,048	1,071	1,009	1,009
	Interfacility	2,164	1,768	1,806	1,266	1,266
	Touch&Go NALF	10,511	13,124	13,406	9,620	9,620
F-14B/D	Full LTO	8,551	6,913	10,319	11,064	11,064
	Touch&Go NASO	10,452	7,979	11,910	13,005	13,005
	GCA Box	1,494	586	875	886	886
	Interfacility	1,485	1,269	1,894	2,009	2,009
	Touch&Go NALF	7,226	9,281	13,854	14,673	14,673
A-6	Full LTO	13,401	2,182	0	0	0
	Touch&Go NASO	16,380	2,666	0	0	0
	GCA Box	2,341	381	0	0	0
	Interfacility	2,326	379	0	0	0
	Touch&Go NALF	11,086	1,805	0	0	0
F/A-18	Full LTO	0	1,656	1,656	18,218	26,499
	Touch&Go NASO	0	2,392	2,392	26,309	38,268
	GCA Box	0	0	0	755	1,098
	Interfacility	0	0	0	2,545	3,702
	Touch&Go NALF	0	0	0	18,503	26,913
A-4	Full LTO	4,169	0	0	0	0
	Touch&Go	5,096	0	0	0	0
F-16	Full LTO	936	0	0	0	0
	Touch&Go	1,144	0	0	0	0
F-5	Full LTO	808	0	0	0	0
1 2	Touch&Go	988	0	0	0	0
TC-4C	Full LTO	638	0	0	0	0
10.10	Touch&Go	780	0	0	0	0
UH-3H	Full LTO	662	0	0	0	0
C-12	Full LTO	261	<del></del>	1,664	1,664	1,664
0 12	Touch&Go	445	1,664			2,722
	GCA Box	0	2,722	2,722	2,722	
S-3	Full LTO	1,741	1,106 967	1,106	1,106 967	1,106 967
	Touch&Go	1,295	<del></del>	967		<del> </del>
	GCA Box	1,323	930	930	930 372	930 372
T-2C	Full LTO	1,418	372	372	<del> </del>	
T-34	Full LTO	1,040	0	0	1 040	1.040
E-2/C-2	Full LTO NALF	1,074	1,040	1,040	1,040	1,040
1210-2	Touch&Go NALF	25,058	0 479	0	0	
Total	Touchedo HALL	166,172	20,478 104,659	21,374 111,782	21,374 167,140	21,374 197,290

### Notes:

- (1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual F-14 aircraft population mix at Oce
- (2) 1993 Full LTO and Touch and Go NASO operations proportioned from NAS Oceana operations data.
- (3) GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at NAS Oceana. 1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.
- (4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
- (5) A-6 aircraft assumed decommissioned by 1997.
- (6) 1999 and Transient aircraft operations derived from NASMOD analysis (ATAC 1997).
- (7) GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

Key:

LTO = Landing and takeoff cycle

GCA = Ground Control Approach

NASO = Naval Air Station Oceana

NALF = Naval Auxiliary Landing Field

Aircraft (Engine Model)	Mode	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor (IIb /1000 Ib fuell/eng)	actor uell/eng)			Moda	Modal Emission Rates	lates	
					(D) 20A	NOX	93	802	PM10 (2)	VOC(I)	NOX	CO	802	PM10 (2)
F-14A		7.0	15.33	2	31.42	3.22	53.51	0.54	8.96	6.74	69'0	16:11	0.12	1.92
(TF30-P-412A)	훈	16.0	15.33	2	31.42	3.22	55.51	0.54	8.96	15.41	1.58	27.23	0.26	4.40
	lake Off	0.4	796.67	2	0.20	4,79	10.77	0.54	0.00	0.13	3.05	98.9	0.34	0.00
	Climbout	0.4	117.50	2	0.77	19.60	1.38	0.54	2.98	20'0	1.84	0.13	0.05	0.28
	Approach	1.3	71.67	2		10.74	3.43	0.54	7.98	0.28	2.00	0.64	01.0	1.49
	Taxi In/Idle	5.3	15.33	2	31.42	3.22	55.51	0.54	96'8	5.11	0.52	9.02	60'0	1.46
	T&G Level	1.4	71.67	2	1.48	10.74	3.43	0.54	7.98	0.30	2.16	69.0	0.11	1.60
	GCA Box	7.6	71.67	2	1.48	10.74	3.43	0.54	7.98	2.06	14.93	4.77	0.75	11.10
	Interfacility	9.1	71.67	2	1,48	10,74	3.43	0.54	7.98	0.34	2.46	0.79	0.12	1.83
	Check idle	25.0	15.33	2	31.42	3.22	55.51	0.54	8.96	24.08	2.47	42.55	0.41	6.87
									Touch and Go	9.65	90.9	1.46	0.26	3.37
									Full LTO w/hot ref.	27.74	9,6	55.80	96.0	9.54
									Full LTO w/o hot ref.	36.41	10.58	71.12	1.1	12.01
									Interfacility	0.34	3.46	0.79	0.12	1.83
									GCA Box	2.06	14.93	4.77	0.75	11.10
			1											
F-14B/D	Idle/Taxi Out	7.0	19.52	2	3.65	2.77	16.60	0.54	12.38	00.1	0.76	4.54	0.15	3.38
(F110-GE-400)	Hot Ketueling Idle	0.91	19.52	7	3,65	2.77	16.60	0.54	12.38	2.28	1.73	10.37	0.34	7.73
	I ake OII	4.0	195.32	7	2 0	28.03	0.84	0.54	2.81	90.0	4.47	0.13	80.0	0.44
	Annosch	4:0	132.02	7	0 40 0 0	50.02	0.84	0.54	2.81	90.0	4.47	0.13	0.08	0.44
	Tavi In/Idle	C 2	59 61	7 (	0776	10.63	0/.0	6.0	0.10	800	0./3	0.26	61.0	2.11
	T&G Level	6.6 A 1	64 10	7 (	6. 6 0	17.7	10.00	0.54	25.70	0.70	/ca	3.43		2.56
	GCA Box	9.7	64.10	2	56.0	8.75	1.01	750	6.10	77.7	10.00	200	0.10	1.09
	Interfacility	1.6	64.10	2	960	8.75	1.64	0.54	6.10	0.19	97.1	0.34	110	501
	Check Idle	25.0	19.52	2	3.65	2.77	16.60	0.54	12.38	3.56	2.70	16.20	0.53	12.08
									Touch and Go	0.32	12.83	0.69	0.37	3.64
									Full LTO w/ hot ref.	4.25	18.79	18.87	0.95	16.67
									Full LTO w/o hot ref.	5.53	19.76	24.70	1.14	21.02
									Interfacility	0.19	1.79	0.34	0.11	1.25
									GCA Box	1.18	10.88	2.04	0.67	7.59
	F 10. C						-							
4-0 /1 61 D 0D)	Tet negation	0.7	11.33	7	07.24	6.1	63.78	0.54	0.00	6.69	0.28	10.12	0.09	0.00
17-L-9D)	Tot Ketucining Idle	20.0	11.33	7	9774	1.79	63.78	0.54	0.00	19.13	0.81	28.91	0.24	0.0
	Climbout	0.4	77.00	7	66.0	13.05	0.71	0.54	00.00	60.0	1.28	0.07	0.05	0.00
	Annroach	i c	38 33	7	173	OF ST	3.00	6.04	00'0	0.03	0.38	0.17	0.03	00.0
	Taxi In/Idle	5.3	11 43	2	10.00	02	43.78	100	00.00	717	0.03	3 13	0.05	0.00
	T&G I evel	7.5	38 13	7 (	1.77		03.76	0.34	00:00	3.07	0.21	7.66	0.06	0.00
	GCA Box	9.7	38 13	, ,	3 5	100	10.54	4C.0	00.00	0.18	0.08	7.13	0.06	0.00
	Interfacility	91	38 33	,	1.70	72.9	10.54	4.0	00.00	07.1	4.71	48.7	0.40	20.00
	Check Idle	18.0	11.33	2	42.20	6.71	63.78	0.54	0.00	17.21	0.70	26.01	0.0	8 6
									Touch and Go	0.39	1.89	2.35	0.14	000
									Full LTO w/ hot ref.	31.18	3.81	47.97	0.53	0.00
									Full LTO w/o hot ref.	29.27	3.72	45.08	0.51	0.00
									Interfacility	0.21	0.78	1.29	0.07	0.00
			_						2	S. 100 0 00 00 00 00 00 00 00 00 00 00 00	ない インディン 選挙	ì		

				MODAL	EMISSION	ARS 1 MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	I AIRCRAFT,	AT NAS OC	EANA					
Aircraft (Engine Model)	Mode	Time in Mode (minutes)	Fuel Flow ((1b/min)/eng)	Engines			Emission Factor (IIb /1000 lb fuel]/eng)	ell/eng)			Modal	Modal Emission Rates (lb/mode)	ıtes	
•		,	i		(U) OO	NOx	00	805	PM10 (2)	(I) DOA	NOX	93	S02	PM10 (2)
A-4	Taxi Out/Idle	6.3	11.33	-	42,20	8.1	63.78	0.54	0.00	3.11	0.13	4.70	0.04	0.00
(J-52-P-8B)	Take Off	0.4	122.83	_	0.93	13.05	0.71	0.54	0.00	0.05	0.64	0.03	0.03	0.00
_	Climbout	0.4	72.00	_	0.58	01.01	3.00	0.54	00'0	0.02	0.29	0.09	0.02	0.00
	Approach	1.3	38.33	_	1.72	6.34	10.54	0.54	00.0	60'0	0.32	0.53	0.03	0.00
	Taxi In/Idle	6.5	11.33	-	42.20	62'1	63.78	0.54	0.00	3.11	0.13	4.70	0.04	0.00
	T&G Level	1.4	38.33	_	1.72	6.34	10.54	0.54	00'0	000	0.34	0.57	0.03	00'0
	Check Idle	18.0	11.33	_	42.20	1.79	63.78	0.54	0.00	8.61	0.37	13.01	0.11	0.00
									Touch and Go	0.19	960	1.18	0.07	0.00
									Full LTO w/o hot ref.	14.97	1.88	23.05	0.26	0.0
F-16	Taxi Out/Idle	6.5	17.67	_	2.26	3:96	19.34	0.54	0.09	0.26	0.45	2.22	90'0	0.01
(F100-PW-100)	Take Off	0.4	136.67	-	0.10	16,50	55.10	0.54	00.00	0.03	4.86	16.24	0.16	0.00
	Climbout	0.4	173.33	-	• 0.05	44.00	1.80	0.54	0.83	00:0	3.05	0.12	0.04	90.0
	Approach	1.3	20.00	-	0.60	8) =	3.00	0.54	0.33	0.04	27.0	0.20	0.04	0.01
	Taxi In/Idle	6.5	17.67	-	2.26	3:96	19.34	0.54	0.09	0.26	0.45	2.22	90.0	0.01
	T&G Level	1.4	20.00	-	09:0	9: 1:0	3.00	0.54	0.33	0.04	0.77	0.21	0.04	0.02
									Touch and Go		4.54	0.53	0.11	0.09
							A STATE OF THE PERSON NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN COLUMN NAMED IN		Full LTO w/o hot ref.	94	9.54	21.00	0.36	0.088
9	Tout Out Italia	37	23.3	,	36.36	1 1 1	150.00	V 5 0	000	91.5	110	13 70	20.0	100
(184-GE-21)	Take Off	70	177.50	,	010		36.40	0.54	00.0	200	0 80	\$ 17	80.0	200
(17.7)	Climbout	0.4	53.33	2	0.25	5.00	21.56	0.54	000	0.01	0.21	0.92	0.02	000
	Approach	1.3	20,00	2	2.58	2.92	46.25	0.54	0.00	0,13	0.15	2.41	0.03	0.00
	Taxi In/Idle	6.5	6.67	2	24.45	1.25	159.00	0.54	00:00	2.12	0.11	13.79	0.05	0.00
	T&G Level	4.1	20.00	2	2.58	2.92	46.25	0.54	0.00	0.14	0.16	2.59	0.03	0.00
									Touch and Go	6.3	0,53	5.91	0.08	0.00
									Full LTO w/o hot ref	4.38	1.38	36.07	0.22	0.00
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						11							:
F/A-18	Taxi Out/Idle		10.40	2	58.18	1.16	137.34	0.40	12.38	8,47	0.17	20.00	90.0	08.T
(F404-GE-400)	Hot Retueling Idle	!	10.40	7	58.18	1.16	137.34	0.40	12.38	13.31	0.27	31.42	0.09	2.83
	Take Off	0.4	473.28	7	61.0	9.22	23.12	0.40	0.00	0.03	3.49	8.75	0.15	0.00
	Ciimoour	1.4	143.12	7	16.0	25.10	50.1	0.40	18.7	40.0	2.08	0.12	0.05	0.32
	Travi In/Idla	5.1	10.70	4 <u> </u>	49.19	1.16	137.34	040	17.20	6 41	0.13	- N	0.0	32
	T&GLevel	17	00.09	2	0.44	8 17	1.78	0.40	6.10	000	171	9.0	0.0	1 24
	GCA Box	9.0	00.09	2	0.44	8.37	1.78	0.40	6.10	0.48	9.04	,1.92	0.43	6.59
	Interfacility	1.4	85.00	2	0.38	11.78	1.16	0.40	6.10	60'0	2.80	0.28	0.10	1.45
	Check Idle	12.0	10.40	2	58.18	1.16	137.34	0.40	12.38	14.52	0.29	34.28	0.10	3.09
	APU	2.5	3.28	-	0.25	6.25	2.00	0.40	0.22	00'0	\$0.0	0.02	0.00	0.00
									Touch and Go	0.20	6.04	0.79	0.20	2.62
									Full LTO w/ hot ref.	28.36	8.39	75.74	0.46	7.38
									Full LTO w/o hot ref.		8.46	78.62	0.47	7.64
									Interfacility	0.09	2.80	0.28	0.10	1.45
					CO. 00 - 00 - 00 - 00 - 00 - 00 - 00 - 00	THE PERSON NAMED IN COLUMN				Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Contro	200 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A 100 A			04 /

7	75.74			<u> </u>							Men			
Aircrait (Engine Model)	Mode	I ime in Mode (minutes)	((Ib/min)/eng)	Engines		3	Emission Factor (lib /1000 lb fuell/eng)	tetor el]/eng)			Moda	Modal Emission Kates (1b/mode)	cates	
•					VOC(I)	NOx	00	S02	PM10 (2)	(II)	NOx	00	802	PM10 (2)
S-3	Taxi Out/Idle	6.5	7.63	2	14.99	69'1	86:06	0.54	3.26	1.49	0.17	6.02	0.03	0.32
(TF34-GE-400)	(TF34-GE-400) Hot Refueling Idle	8.0	7.63	2	14.99	69,1	86:06	0.54	3.26	1.83	0.21	E:E	0.07	0.40
	Take Off	0.4	63.33	7	0.39	7.51	5.95	0.54	2.11	0.02	0.38	0.30	0.03	0.11
	Climbout	0.4	1.67	2	2.63	3.42	33.57	0.54	6.85	0.02	0.02	0.21	0.00	0.04
	Approach	1.3	79.7	2	2.63	3.42	33.57	0.54	6.85	0.05	0.07	0.67	0.01	0.14
- سند	Taxi In/Idle	6.5	7.63	2	14,99	69:1	86.06	0.54	3.26	1.49	0.17	9.02	0.05	0.32
	T&G Level	8.	79.7	2	2.63	3.42	33.57	0.54	6.85	0.07	60.0	0.93	0.01	0.19
	GCA Box	7.5	79.7	7	2.63	3.42	33.57	0.54	6.85	060	0.39	3.86	90.0	0.79
									Touch and Go		0.18	1.80	0.03	0.37
<del></del>									Full LTO w/ hot ref.		10.1	30.33	0.21	1.33
turder 15									Full LTO w/o hot ref.		0.80	19.23	0.15	0.93
		Transfer of Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Later and Late							GCA Box	0.30	0.39	3.86	90.0	0.79
												7227		
C-12/TC-4	Taxi Out/Idle	19.0	2.45	7	101.63	1.97	115.31	0.54	0.00	9.46	0.18	10.74	0.05	0.00
(PT6A-41)	Take Off	0.5	8.50	2	1.75	86'2	5.10	0.54	00.00	0.0	0.07	0.04	0.00	0.00
71	Climbout	2.1	7.88	2	2.03	7.57	6.49	0.54	0.00	0.07	0.25	0.21	0.02	0.00
	Approach	3.7	4.55	7	22,71	4.65	34.80	0.54	0.00	92.0	0.16	1.17	0.02	0.00
	Taxi In/Idle	7.0	2.45	2	101.63	1.97	115.31	0.54	0.00	3.49	0.07	3.96	0.02	0.00
	T&G Level	2.0	4.55	2	22.71	4.65	34.80	0.54	00:0	0.41	80.0	0.63	0.01	0.00
-64	GCA Box	7.5	4.55	2	22.71	4.65	34.80	0.54	00.0	1.55	0.32	2.38	0.04	0.0
									Touch and Go	1.25	0.49	2.02	0.05	0.00
		THE RESERVE AND ADDRESS OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE							Full LTO w/o hot ref.		0.73	16.12	0.11	0.0
		and debetween the state of the formal property of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the sta							GCA Box	1.55	0.32	2.38	0.04	0.00
												- Carnin		
ин-зн	Taxi Out/Idle	8.0	2.20	2	130.42	1.43	178.44	0.54	0.00	4.59	0.05	6.28	0.02	0.00
(TS8-GE-8F)	Take Off	0.0	13.10	2	0.40	5.47	9.03	0.54	0.00	00.0	0.00	0.00	0.00	0.00
	Climbout	5.7	10.45	7	0.80	4.68	14.13	0.54	0.00	01.0	0.08	0.11	0.03	0.00
	Approach	5.7	89.6	7	1,12	4.47	17.28	0.54	00:0	0.13	0.53	2.06	90.0	0.00
	Taxi In/Idle	7.0	2.20	2	130.42	1.43	178.44	0.54	00.00	4.02	0.04	5.50	0.02	0.00
									Full LTO w/o hot ref.	8.84	0.71	13.94	0.13	0.00
T-34	Taxi Out/Idle	6.5	1.92	-	50.17	2.43	64.00	0.54	0.00	0.63	0.03	0.80	0.01	0.00
(PT6A-25)	Take Off	0.4	7.08	_	00 0	7.81	10.1	0.54	00.0	0.00	.0.02	0.00	00.0	0.00
-	Climbout	0.4	29'9	-	0.00	7.00	1.20	0.54	00'0	0.00	0.02	0.00	0.00	0.00
	Approach	1.3	3.58	_	2.19	8.37	23.02	0.54	00.0	0.0	0.04	0.11	0.00	0.00
	Taxi In/Idle	6.5	1.92	-	50.17	2.43:7	64.00	0.54	0.00		6.03	080	0.01	0.00
						Carlo Carlo Carlo Construence					and the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the second name of the secon			



# MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA

Table A-2

Aircraft	Mode	Time in Mode	Fuel Flow	Engines		Emission Factor	etor			Modal	Modal Emission Rates	ates	***
(Engine Model)		(minutes)	((lb/min)/eng)			(lib /1000 lb fuel/eng)	rel]/eng)				(lb/mode)		
					VOC (1) NOx	00	S02	PM10 (2)	(I) 20A	NOX	00	<b>S02</b>	PM10 (2)
T-2	Taxi Out/Idle	6.5	9.33	2	3.68 3.68	98:111	0.54	0.00	1.44	0.45	13.57	0.07	0.00
(J85-GE-2)	Take Off	0.4	48.17	2		21.56	0.54	0.00	0.02	0.25	0.83	0.02	0.00
	Climbout	0.4	35.92	2	0.64 5.67	28.38	0.54	00:0	0.02	0.16	0.82	0.02	0.00
	Approach	1.3	17.42	2		63.53	0.54	0.00	0.11	0.18	2.88	0.02	0.00
	Taxi In/Idle	6.5	9.33	2	3.68	111.86	0.54	0.00	1.44	0.45	13.57	0.07	00.0
								Full LTO w/o hot ref.	3.02	1.48	31.66	0.19	0.00
								- Arit & Later Company (1997)					
E-2/C-2	Taxi Out/Idle	19.0	86.6	2	1924. 3,53	30.11	0.54	0.00	7.30	1.34	11.42	0.20	0.00
(TS6-A-16)	Take Off	0.5	36.98	2	0.14 10.45	9.65	0.54	0.00	0.01	0.39	0.02	0.02	00.0
	Climbout	2.1	36.98	2		0.65	0.54	0.00	0.02	1.62	0.10	0.08	0.00
1	Approach	3.7	33.27	2	0.17 9.93	0.42	0.54	0.00	0.04	2.44	0.10	0.13	0.00
	Taxi In/Idle	7.0	86.6	2		30.11	0.54	0.00	2.69	0.49	4.21	0.08	0.00
	T&G Level	1.6	15.00	2	0.95 6.52	4.54	0.54	00.0	0.05	0.31	0.22	0.03	0.00
								Touch and Go	110	4.38	0.42	0.24	0.00
								Full LTO w/o hot ref.	. 10.05	6.29	15.85	0.52	0.00

(2) Emission factors equal to 0.00 for PM10 indicate that no factor has been determined (AESO 1996). (1) Aircraft VOC reported as HC in the form CHy/x
(2) Emission factors equal to 0.00 for PM10 indicate that no factor has bee σ (3) Emission factors from AESO Report Number 6-90 and USEPA AP-42.

(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Modal emission rates calculated from data provided by AESO.

(6) T&G, GCA Box and Interfacility level flight TIMs based on flight track profile speeds and distance for F-14, E-2/C-2, F/A-18 and S-3 aircraft. Level TIMs for C-12s and TC-4s were assumed to be the same as E-2/C-2 All other aircraft are assumed to have the same level TIMs as F-14s.

(7) Modal emission rates for T&G operations include approach, climbout, and T&G level modes only.

(8) Modal emission rate for full LTO w/o hot refueling includes APU use (F/A-18 only) and check idle mode.

(9) Modal emission rate for full LTO w/hot refueling does not include APU use (F/A-18 only) or check idle mode.

(10) GCA box and interfacility mode emission rates are presented only for aircraft that conduct low-altitude operations between NAS Oceana and NALF Fentress.

(11) F-14B and F-14D have the same engine types, and therefore, have identical emission rates.

(12) TC-4s are assumed to have the same emission rates as C-12s.

(13) FCLP mode is included in T&G since flight modes are similar.

Key:

LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle VOC = volatile organic compounds LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle T&G = touch and go NOx = oxides of nitrogen CO = carbon monoxide

Interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach PM10 = particulate matter SO2 = sulfur dioxide

AESO = Aircraft Environmental Support Office

TIM = time in mode

ARS 1 AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999
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	No or		E LOCK		The second second								
	Aircraft		Onerations/Vear new oner	or now one-patient	How Total		5	2		802	-	2	110
			or semanation of			per operation 		per operation (Ib)	Total (TPY)	per operation (Ib)	Total (TPV)	per operation	Total
1993	F-14A	Full LTO w/ hot ref.	3,116	27.74	43.22	69'6	15.10	55.80	86.94	0.96	7051	(CII)	14 27
		Full LTO w/o hot ref.	9,349	36.41	170.19	10.58	49.45	71.12	332 43		5.50	10.61	52.12
		Touch&Go	15,236	0.63	4.91	909	45.70	1.46	11.10	0.26	86	7.7	55.65
		GCA Box	2,178	2.06	2.24	14.93	16.26	4.77	5.19	0.75	0.82	11.76	12.00
		Interfacility	2,164	0.34	0.37	2.46	2.67	0.79	0.85	0.12	0.13	83	1.08
													2
	F-14B	Full LTO w/ hot ref.	2,138	4.25	4.54	18.79	20.09	18.87	20.17	0.95	1.02	16.67	17.81
		Full LTO w/o hot ref.	6,414	5.53	17.73	92.61	63.38	24.70	79.20	1.14	3.66	21.02	67.30
		Touch&Go	10,452	0.32	1.69	12.83	67.03	69'0	3.60	0.37	1.92	3.64	19.04
		GCA Box	1,494	1.18	0.88	10.88	8.13	2.04	1.52	29'0	0.50	7.59	567
		Interfacility	1,485	61.0	0.14	1.79	1.33	0.34	0.25	0.11	0.08	1.55	0.03
												]	2
	A-6	Full LTO w/ hot ref.	3,350	31.18	52.24	3.81	6.38	47.97	80.37	0.53	0.89	00.00	ַ טַ טַ
		Full LTO w/o hot ref	10,051	29.27	147.10	3.72	18.72	45.08	226.57	0.51	2.56	00.0	00.0
		Touch&Go	16,380	0.39	3.19	68']	15.51	2.35	19.28	0.14	1.17	0000	00.0
		GCA Box	2,341	1.28	1.50	4.71	5.52	7.84	9.17	0.40	0.47	0000	00.0
		Interfacility	2,326	0.21	0.25	0.78	06.0	1.29	1.50	0.07	0.08	000	000
	•												
	A-4	Full LTO w/o hot ref.	4,169	14.97	31,21	1.88	3.91	23.05	48.05	0.26	0.54	00'0	000
		Touch&Go	5,096	61.0	05.0	0.95	2.41	1.18	3.00	0.07	0.18	0.00	00.0
			4										!
	F-16	Full LTO w/o hot ref.	936	0.59	0.28	9.54	4.46	21.00	9.83	0.36	0.17	60.0	0.04
		Touch&Go	1,144	0.08	0.05	4.54	2.59	0.53	0.30	0.11	90.0	0.09	0.05
	£	×										:	
	?	Full L1O w/o hot ret.	808	4.38	1.7	1.38	0.56	36.07	14.57	0.22	60.0	0.00	00.00
		1 ouch&Go	886	0.29	0.14	0.53	0.26	5.91	2.92	0.08	0.04	0.00	0.00
	10.4	E.H.I.TO / Lee are	062	***			N. Y.						
	5	Tull LIO W/9 HOLISI.	000	13.79	4.40	0.73	0.23	16.12	5.14	0.11	0.03	00.00	00.0
		1 ouch&Go	780	1.25	0.49	0.49	61.0	2.02	0.79	0.05	0.02	0.00	0.00
		Full I TO w/o hot ref	677	700				31					
		I WILLIA WO HOLLEL	700	<b>+</b> 0.0	76.7	U./I	0.23	13.94	4.61	0.13	0.04	00.00	00'0
	C-12	Full LTO w/o hot ref.	261	13.79	08 <u> </u>	0.73	0.00	16.17	υįς				6
-".		Touch&Go	445	1.25	0.28	0.49	0.11	202	0.10	0.11	10:0	0.00	00.0
		-							:	6.0	0.00	90.0	0.00
·	S-3	Full LTO w/ hot ref.	870	4.89	213	lo I	0.44	30.33	13.20	0.21	0.09	133	0.58
		Full LTO w/o hot ref.	870	3.06	1.33	0.80	0.35	19.23	8.37	0.15	90.0	0.93	0.53
		Touch&Go	1,295	41.0	60'0	81.0	0.12	1.80	1.17	0.03	0.02	0.37	D 24
. ·		GCA Box	1,323	0:30	0.20	0.39	0.26	3.86	2.55	90.0	0.04	0.79	0.52
	4	,											
	77-1	ruil L10 w/o hot ret.	1,418	3.02	2.14	1.48	1.05	31.66	22.45	61.0	0.14	0.00	00.0
	T-34	Full LTO w/o hot ref	1.040	1.76	99.0	PI U	400	16.	000	600	, c	i i	
	Total		111.217		500 87		700	1./1	0.89	0.02	0.01	00.0	0.00
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				<b>₹</b>	IKCKAFI FOI	FOR 1993 AND 1996-1999	AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	AINA					
	Type of	Operation	Number of	20A	ω:	N	7	Ω		SOZ	32	A	12
	Aircraft		Operations/Year per operation	per operation	Total Tex	per operation		per operation	Total	per operation (Ib)		per operation (lb)	
766	F-14A	Full LTO w/ hot ref.	2.405	27.74	33.36	69'6	11.65	55.80	67.10	0.96	1.16	9.54	11.47
2		Full LTO w/o hot ref.	7.216	36.41	131.36	10.58	38.17	71.12	256.58	1.11	4.02	12.01	43.35
		Touch&Go	12,331	590	3.98	00'9	36.99	1.46	86.8	0.26	1.60	3.37	70.77
		GCA Box	1,048	2.06	1.08	14.93	7.83	4.77	2.50	0.75	0.39	11.10	5.82
		Interfacility	1,768	0.34	0.30	2.46	2.18	67.0	0.70	0.12	0.11	1.83	9.1
											* * * * * * * * * * * * * * * * * * * *	:	
	F-14B/D	Full LTO w/ hot ref.	1,728	4.25	3.67	18.79	16.24	18.87	16.30	0.95	0.82	16.67	14.40
		Full LTO w/o hot ref.	5,185	5.53	14.34	97.6	51.23	24.70	64.02	1.14	2.96	21.02	54.4
_		Touch&Go	7,979	0.32	1.29	12.83	51.17	69.0	2.75	0.37	1.47	3.64	14.5
		GCA Box	586	81.1	0.35	10.88	3.19	2.04	09.0	29:0	0.20	7.59	2.22
		Interfacility	1,269	61.0	0.12	1.79	1.14	0.34	0.21	0.11	0.07	1.25	0.7
	A-6	Full LTO w/ hot ref.	545	31.18	8.50	3.81	104	47.97	13.08	0.53	0.15	00.00	00.00
		Full LTO w/o hot ref.	1,636	29.27	23.95	3.72	3.05	45.08	36.88	0.51	0.42	00.00	00.0
		Touch&Go	2,666	0.39	0.52	1.89	2.53	2.35	3.14	0.14	0.19	00.00	0.00
		GCA Box	381	1.28	0.24	4.71	06.0	7.84	1.49	0.40	0.08	0.00	00:0
		Interfacility	379	0.21	0.04	0.78	0.15	1.29	0.24	0.07	0.01	0.00	0.0
											:		
	F/A-18	Full LTO w/ hot ref.	414	28.36	5.87	8.39	1.74	75.74	15.68	0.46	0.10	7.38	1.53
	-	Full LTO w/o hot ref.	1,242	29.57	18.36	8.46	5.26	78.62	48.83	0.47	0.29	7.64	4.74
		Touch&Go	2,392	0.20	0.24	6.04	7.22	0.79	0.95	0.20	0.24	2.62	3.14
			id						it.	iç ç	0.00	* + +	, j
	S-3	Full L I O w/ hot ref.	484	4.89	1.16	10.1	0.24	30.33	(	17.0	0.00	50.0	20.0
		Full LTO w/o hot ref.	484	3.06	0.74	0.80	0.19	19.23	4.65	0.10	0.04	0.93	7.0
		Touch&Go	930	0 1 <b>4</b>	0.07	0.18	60.0	08:1	0.84	0.03	0.0	0.37	0.1
	: :	GCA Box	372	0.30	90.0	0.39	0.07	3.86	0.72	0.06	0.01	0.79	0.15
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	UH-3H	Full LTO w/o hot ref.	0	8.84	000	17.0	0.00	13.94	0.00	0.13	0.00	0.00	<u></u>
	5	10 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		13.70	11.48	0.73	0.60	15.17	17 21	11.0	0.00	00.0	000
	71-0	Tuil LIO W/0 liot ict.	7777	1.55	09.1	0F U	0.67	202	2.75	008	90.0	000	00.0
		GCA Box	1.106	25.1	0.86	0.33	81.0	2.38	1.31	0.04	0.02	00.00	00.00
													:
	T-34	Full LTO w/o hot ref.	1,040	1.26	99'0	0.14	20'0	1.71	0.89	0.02	0.01	00.00	00.00
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Aircraft         Full Convolution of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control		Type of	Operation	Number of	- V0C		R 1993 AND	1996-1999 X	03		<u>os</u>	2)	Id	017
F-14A   Full LTO whole ref.   1,713   21,74   21,75   7149   5150   5150   48.13   0.65   0.13   9.54   9.54   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1		Aircraft		Operations/Year	per operation		per operation	E - 36	per operation	Total	per operation	1	per operation	*
Full I.TO w/s bot ret   5,175   3541   9421   10.58   27737   71.12   184.01   17.18   12.88   12.01     Touch Roco   10,203   2065   13.49   7.53   4.74   2.41   0.75   0.38   1.33   1.31     Touch Roco   10,203   2065   1.24   1.25   1.25   0.79   0.50   0.12   0.08   1.33   1.13     Full I.TO w/s bot ret   2,766   4,25   2,587   18.79   2,599   18.87   2,509   0.55   0.13   2.10     Full I.TO w/s bot ret   4,553   2,587   2,597   2,599   18.87   2,509   0.57   0.39   7.59     Full I.TO w/s bot ret   4,553   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   1,554   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597     Full I.TO w/s bot ret   4,555   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,597   2,	8661	F-14A	Full LTO w/ hot ref.	1,725	27.74	23.92	69.6	8.36	55.80	48.13	0.96	0.83	9.54	8.23
Touch&Go   10,203   0,655   3.39   6.00   146   743   0.25   133   1317     Incrementality   1,266   0.34   0.21   2.46   1.04   1.245   1.55   0.59   0.50   0.12   0.08   1110     Incrementality   1,266   0.34   0.21   2.46   0.31   1.245   0.50   0.50   0.12   0.08   1110     Full LTO who in ref   1,305   0.22   0.25   0.25   0.25   0.34   0.50   0.50   0.12   0.30   0.34     Full LTO who in ref   1,305   0.22   0.25   0.25   0.34   0.34   0.34   0.11   0.35   0.35   0.35     Full LTO who in ref   1,564   2.357   2.204   0.65   0.34   0.11   0.12   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.3	<del></del>		Full LTO w/o hot ref.	5,175	36.41	94.21	10.58	27.37	71.12	184.01	1111	2.88	12.01	31
GCA Box   1,009   2,066   1,044   14,93   7,335   4,777   2,41   0,75   0,18   11,10			Touch&Go	10,203	590	3.29	90'9	30.60	1.46	7.43	0.26	1.33	3.37	
High   Figure   1,266   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,246   1,247   1,14   1,47   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102   1,102	<del></del>		GCA Box	1,009	2.06	1.04	14.93	7.53	4.77	2.41	0.75	0.38	11.10	
Fall LTO w/ hot ref   2766   425   587   1879   2559   1887   2609   0585   132   1667     Fall LTO w/ hot ref   8,298   5533   22.94   1976   82.00   24.70   102.47   11.4   47.4   21.05     Touch&Go   13,005   0.32   21.0   21.83   83.44   0.65   0.95   0.37   2.39   3.64     Fall LTO w/ hot ref   4,555   28.56   64.58   8.39   19.0   75.74   0.14   0.11   0.11   1.25     Fall LTO w/ hot ref   13,644   25.35   0.20   0.18   9.04   3.41   172.49   0.45   0.10   0.11   1.25     Fall LTO w/ hot ref   4,545   2.65   6.04   79.46   0.75   0.75   0.75   0.75   0.75     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.07   0.18   0.07   0.18   0.07     Fall LTO w/ hot ref   4,84   4.89   1.18   0.74   0.18   0.05   0.15   0.05   0.01   0.75     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.07   0.18   0.07   0.05   0.01   0.75     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.07   0.18   0.07   0.05   0.01   0.75     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.05   0.05   0.01   0.75     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   1.18   0.73   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.14   0.07   0.18   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.14   0.07   0.18   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.14   0.07   0.18   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.14   0.07   0.18   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.05   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.05   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.05   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.05   0.05   0.05   0.05   0.05   0.05   0.05     Fall LTO w/ hot ref   4,84   4.89   0.14   0.07			Interfacility	1,266	0.34	0.21	2.46	1.56	0.79	0.50	0.12	80.0	1.83	
Fall LTO w/ hot ref.   2,766	<u> </u>										A . March &		1	:
Figli I-TO w/o hoi ref	<del></del>	F-14B/D	Full LTO w/ hot ref.	2,766	4.25	5.87	18.79	25.99	18.87	26.09	0.95	1.32	16.67	23.05
Touch&Coo   13,003   0.32   2.10   12.83   83.41   0.69   4.48   0.37   2.39   3.64     GCA Box   886	•		Full LTO w/o hot ref.	8,298	5.53	22.94	92.61	82.00	24.70	102.47	1.14	4.74	21.02	œ
GCA Box   886   118   0.22   1088   4.82   2.04   0.90   0.67   0.30   7.59			Touch&Go	13,005	0.32	2.10	12.83	83.41	69.0	4.48	0.37	2.39	3.64	
FA-18         Full LTO w/ hoir ref.         4,355         28.36         64.58         8.39         19.10         75.74         172.49         0.46         1.05         7.38           FA-18         Full LTO w/ hoir ref.         4,555         28.36         64.58         8.39         19.10         75.74         172.49         0.46         1.05         7.48           Full LTO w/ hoir ref.         13,664         29.57         202.01         8.46         57.81         78.62         537.09         0.47         3.23         7.62           CGA Box         755         0.48         0.18         8.04         3.41         1.92         0.73         0.43         0.16         6.59           GCA Box         755         0.48         0.18         8.04         3.41         1.92         0.73         0.43         0.16         6.59           HinterBallity         2,545         0.09         0.12         2.80         3.57         0.28         0.73         0.16         0.59         0.15         0.59         0.73         0.14         0.09         0.13         0.01         0.14         0.07         0.18         0.09         1.80         0.03         0.01         0.09         0.01         0.07	<del></del>		GCA Box	988	81.1	0.52	10.88	4.82	2.04	06.0	19:0	0.30	7.59	3.36
Fig.   Full LTO w/hot ref.   4,535   28.36   64.38   8.39   19.10   75.74   77.249   0.46   1.05   7.38   7.64   7.64   78.65   537.09   0.47   3.23   7.64   7.64   78.65   537.09   0.47   3.23   7.64   7.64   78.65   537.09   0.47   3.23   7.64   7.64   78.65   78.62   25.90   2.59   2.62   2.59   2.62   2.59   2.62   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2.65   2	•		Interfacility	2,009	0.19	0.20	62.1	1.80	0.34	0.34	0.11	0.11	1.25	
FAA-18         Full LTO w/ hot ref         4,555         28.36         64.58         8.39         19.10         75.74         172.49         0.46         1.05         7.38           Full LTO w/ hot ref         13,664         29.57         20.201         8.46         57.81         78.62         537.09         0.47         3.23         7.64           GCAB Box         75.5         0.48         0.18         9.04         3.46         0.79         10.42         0.20         2.59         2.65           GCAB Box         75.5         0.48         0.18         9.04         3.47         0.28         0.73         0.13         0.16         6.59           Full LTO W/o bit ref         4.84         4.89         1.18         1.01         0.24         3.03         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.15         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05	1													
Full LTO w/o hoi ref.   13,664   29,57   202.01   846   5781   78.62   537.09   0.47   3.23   7.64     Touch&Co		F/A-18	Full LTO w/ hot ref.	4,555	28.36	64.58	8.39	19.10	75.74	172.49	0.46	1.05	7.38	I
Full LTO w/ hot ref.         1,644         10,42         0,20         2,59         2,62           GCA Box         755         0,48         0,18         9,04         3,41         1,92         0,73         0,43         0,16         6,59         2,62           GCA Box         755         0,48         0,18         9,04         3,41         1,92         0,73         0,43         0,16         6,59         2,62           Full LTO w/ hot ref.         484         4,89         1,18         1,01         0,24         30,33         7,33         0,21         0,03         1,33           Full LTO w/ hot ref.         484         3,06         0,74         0,89         0,19         1,923         4,65         0,15         0,04         0,93           C-12         Full LTO w/ hot ref.         1,644         13,79         11,48         0,73         0,60         0,67         2,05         0,72         0,06         0,00           C-12         Full LTO w/o hot ref.         1,106         1,37         0,49         0,67         2,02         2,75         0,06         0,00           GCA Box         1,106         1,53         0,49         0,67         2,02         2,75         0,06			Full LTO w/o hot ref.	13,664	29.57	202.01	8.46	57.81	78.62	537.09	0.47	3.23	7.64	52
GCA Box         755         048         0.18         9.04         341         1.92         0.73         0.43         0.16         6.59           Interfacility         2,545         0.09         0.12         2.80         3.57         0.28         0.35         0.10         0.12         1.45           S-3         Full LTO w/hot ref.         484         4.88         1.8         1.01         0.24         30.33         7.33         0.21         0.03         0.13         0.93           Full LTO w/hot ref.         484         3.04         0.74         0.80         0.19         1.80         0.84         0.03         0.01         0.93           GCA Box         372         0.30         0.06         0.39         0.07         3.86         0.73         0.06         0.01         0.79           GCA Box         1,106         1.55         1.69         0.49         0.67         2.02         2.75         0.06         0.00           GCA Box         1,106         1.55         0.86         0.32         0.18         2.38         1.31         0.04         0.00           T-34         Full LTO w/o hot ref.         1,040         1.26         0.14         0.07 <td< td=""><td>•</td><td></td><td>Touch&amp;Go</td><td>26,309</td><td>0.20</td><td>2.65</td><td>6.04</td><td>79.46</td><td>0.79</td><td>10.42</td><td>0.20</td><td>2.59</td><td>2.62</td><td>34</td></td<>	•		Touch&Go	26,309	0.20	2.65	6.04	79.46	0.79	10.42	0.20	2.59	2.62	34
S-3         Full LTO w/ hot ref.         484         489         118         1 01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         4.89         1.18         1 01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           C-12         Full LTO w/o hot ref.         1,664         13.79         11.48         0.73         0.60         0.67         2.02         2.75         0.06         0.00           C-12         Full LTO w/o hot ref.         1,664         13.79         11.48         0.73         0.60         0.67         2.02         2.75         0.06         0.00           GCA Box         1,106         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.00           GCA Box         1,106         1.26         0.66         0.18         2.38         1.31         0.04         0.02         0.00           T-34         Full LTO w/o hot ref.         1,040			GCA Box	755	0.48	0.18	6.04	3.41	1.92	0.73	0.43	0.16	6.59	: 5
S-3 Full LTO w/ hot ref. 484 489 118 101 024 30.33 7.33 0.21 0.05 1.33 Full LTO w/ hot ref. 484 3.06 0.74 0.80 0.19 19.23 4.65 0.04 0.93 0.93 1.80 0.84 0.03 0.01 0.37 0.37 0.06 0.39 0.07 0.07 0.08 0.07 0.06 0.01 0.72 0.06 0.01 0.79 0.72 0.06 0.01 0.79 0.06 0.05 0.06 0.00 0.00 0.00 0.00 0.00			Interfacility	2,545	60'0	0.12	2.80	3.57	0.28	0.35	0.10	0.12	1.45	•
S-3 Full LTO w/ hot ref 484 489 118 101 024 30.33 7.33 0.21 0.05 1.33 1.33 Full LTO w/ hot ref 484 306 074 0.80 0.19 19.23 4.65 0.04 0.93 1.30 Touch&Cio 930 0.14 0.07 0.18 0.09 1.80 0.84 0.03 0.01 0.37 0.37 0.06 0.39 0.07 0.07 0.06 0.01 0.79 0.72 0.06 0.01 0.79 0.70 0.06 0.00 0.00 0.00 0.00 0.00 0.00	,													
Full LTO w/o hoi ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Go         930         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01         0.37           GCA Box         372         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01         0.79           C-12         Full LTO w/o hot ref         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.09         0.00           C-12         Full LTO w/o hot ref         1,106         1.35         0.86         0.32         2.75         0.05         0.00           GCA Box         1,106         1.35         0.86         0.18         2.38         1.31         0.04         0.02         0.00           T-34         Full LTO w/o hot ref         1,040         1.26         0.14         0.07         1.71         0.89         0.02         0.01         0.00	******	S-3	Full LTO w/ hot ref.	484	4.89	1.18	101	0.24	30.33	7.33	0.21	0.05	1.33	0.32
C-12         Full LTO w/o hot ref         1,664         1,26         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01         0.37           C-12         GCA Box         372         0.36         0.06         0.09         0.07         3.86         0.72         0.06         0.01         0.79           C-12         Full LTO w/o hot ref         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09         0.00           GCA Box         1,106         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.00           T-34         Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00	1	:	Full LTO w/o hot ref.	484	3.06	0.74	08.0	0.19	19.23	4.65	51.0	0.04	0.93	
C-12 Full LTO w/o hot ref. 1,664 1379 0.06 0.14 0.75 0.60 0.72 0.06 0.01 0.79  Touch&Go 2,722 1.25 1.69 0.49 0.67 2.02 2.75 0.05 0.06 0.00 0.00 0.00 0.00 0.00 0.0	-		Touch&Go	930	0.14	0.07	0.18	0.09	1.80	0.84	0.03	0.01	0.37	:0
Full LTO w/o hot ref.         1,664         13 79         11 48         0.73         0.60         16.12         13.41         0.11         0.09         0.00           Tough&Go         2,722         1.25         1.69         0.49         0.67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,106         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00		:	GCA Box	372	0.30	90'0	0.39	0.07	3.86	0.72	90.0	0.01	0.79	
Full LTO w/o hot ref.         1,664         13 79         11 48         0,73         0,60         16.12         13.41         0.11         0.09         0.00           Tough&Go         2,722         1.25         1.69         0,49         0,67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,106         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00	******	1										:		
Touch&Go         2,722         1.25         1.69         0.49         0.67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,106         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00		C-12	Full LTO w/o hot ref.	1,664	13.79	11.48	0.73	09:0	16.12	13.41	0.11	60.0	00.00	00.0
GCA Box         1,106         1.55         0.86         0.32         0.18         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00			Touch&Go	2,722	1.25	1.69	0.49	0.67	2.02	2.75	0.05	90.0	00.0	0
Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.01         0.00			GCA Box	1,106	1.55	0.86	0.32	0.18	2.38	1.31	0.04	0.02	00.00	0
Full LTO w/o hot ref.   1,040   1.26   0.66   0.14   0.07   1.71   0.89   0.02   0.01   0.00														
	-	T-34	Full LTO w/o hot ref.	1,040	1.26	99.0	0.14	0.07	1.71	0.89	0.02	0.01	00.00	00.0

						ARS 1	,						
				7	AIRCRAFT FOR	FT EMISSIONS AT NAS ( FOR 1993 AND 1996-1999	AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	SANA					
	Type of	Operation	Number of	30A	E	N	NOX	03	0	203		PMI0	
	Aircraft		Operations/Year per	per operation (Ib)	Total	per operation	Total	per operation	Total	per operation	Total	per operation	Total
6661	F-14A	Full LTO w/ hot ref.	1,725	27.74	23.92	69.6	8.46	55.80	48.13	(UII)	(171)	(m)	(1FY)
		Full LTO w/o hot ref.	5,175	36.41	94.21	10.58	27.37	71.12	184 01	111	7.88	15.61	21 00
		Touch&Go	10,203	0.65	3.29	6.00	30,60	1.46	7.43	0.26	133	1 17	17.19
		GCA Box	1,009	2.06	1.04	14.93	7.53	4.77	2.41	0.75	0.38	11.10	\$ 60
		Interfacility	1,266	0.34	0.21	2.46	1.56	0.79	0.50	0.12	80:0	1.83	1.16
										-			
	F-14B/D	Full LTO w/ hot ref.	2,766	4.25	5.87	18.79	25.99	18.87	26.09	0.95	1.32	16.67	23.05
		Full LTO w/o hot ref.	8,298	5.53	22.94	97.61	82.00	24.70	102.47	1.14	4.74	21.02	87.19
		Touch&Go	13,005	0.32	2.10	12.83	83.41	69:0	4.48	0.37	2.39	3.64	23.69
		GCA Box	988	81.1	0.52	10.88	4.82	2.04	06.0	19.0	0.30	7.59	3.36
		Interfacility	2,009	0.19	0.20	1.79	1.80	0.34	0.34	0.11	0.11	1.25	1.26
													1
	F/A-18	Full LTO w/ hot ref.	6,625	28.36	93.93	8.39	27.78	75.74	250.89	0.46	1.53	7.38	24.45
		Full LTO w/o hot ref.	19,874	29.57	293.84	8.46	84.09	78.62	781.22	0.47	4.69	7.64	75.92
		Touch&Go	38,268	0.20	3.86	6.04	115.58	0.79	15.16	0.20	3.77	2.62	\$0.22
		GCA Box	1,098	0.48	0.26	9.04	4.96	1.92	1.06	0.43	0.24	6.59	3.62
	!	Interfacility	3,702	60.0	0.17	2.80	5.19	0.28	0.51	0.10	0.18	1.45	2.69
	k						**				: : : : : : : : : : : : : : : : : : : :		
	6 <del>.</del> 3	Full LTO w/ hot ref.	484	4.89	1.18	10'1	0.24	30.33	7.33	0.21	0.03	1.33	0.32
		Full LTO w/o hot ref.	484	3.06	0.74	08'0	0.19	19.23	4.65	0.15	0.04	0.93	0.23
		Fouch&Go	930	0.14	20:0	0.18	60.0	1.80	0.84	0.03	0.01	0.37	0.17
		GCA Box	372	0.30	90.0	0.39	0.07	3.86	0.72	90.0	0.01	0.79	0.15
	ķ	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1											
	C-12	Full LTO w/o hot ref.	1,664	13.79	11.48	0.73	09.0	16.12	13.41	0.11	0.00	0.00	00.0
		Touch&Go	2,722	1.25	1.69	0.49	29.0	2.02	2.75	0.03	0.06	0.00	00.00
		GCA Box	1,106	1.55	0.86	0.32	81.0	2.38	131	0.04	0.02	00.0	0.00
	į	,					10 M						
	I-34	Full LTO w/o hot ref.	1,040	1.26	99.0	0.14	0.07	1.71	0.89	0.02	10.0	0.00	0.00
	Total	_	124.710	17 17 18 18 18 18 18	1 1 1 1 1				- 一年一月日日十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十				

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) Number of GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at Oceana.

1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.

(3) 1993 Full LTO and Touch and Go NASO proportioned from air traffic operation records.

(4) 1997 operation data taken from baseline scenario data in Wyle (1997).
(5) A-6 aircraft assumed decommissioned by 1997.
(6) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997).
(7) Aircraft VOC reported as HC in the form CHy/x.
(8) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(9) LTOs for GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

VOC = volatile organic compounds

Key:

SO2 = sulfur dioxide PM10 = particulate matter NOx = oxides of nitrogen CO = carbon monoxide

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle

TPY = tons per year

spunod = qı

			PM10	Total per operation Total	<b>@</b>	1.37 3.37 17.70		1.33 3.64 13.17		0.28 0.00 0.00	3.04 0.00 0.00		0.79 0.00 0.00	6.81		1.70   3.37   22.10		1.71 3.64 16.91		0.00 0.00 0.00	2.49 0.00 0.00	!	00.00	6.03			3.37	1.74 3.37 22.58	3.37	3.37	3.64
And the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t			\$02	per operation	(g)	0.26		0.37		0.52	0.24		0.14			0.26		0.37		0.52	0.24		0.14		-		0.26	0.26	0.26	0.26	0.26
			02	Total	(TPY)	7.66		2.49		8.51	5.29		13.05	37.00		9.56		3.19		00:00	4.32		2.12	19.20		77.0	7.11	7.11	4.77	4.77	4.77
		IRESS	2	per operation	<b>(</b>	1.46		69.0		15.85	0.42		2.35			1.46		0.69		15.85	0.42		2.35			1 46	54.1	04.1	69'0	69.0	0.69
1-4	1	AIRCKAFI EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	NOX	Total	(TPY)	31.53		46.34		3.38	54.89		10.50	146.63		39.36		59.52		0.00	44.85		1.71	145.45		1007	17:0	17:01	88.85	88.85	88.85
Table A-	ARS	EMISSIONS AT NALF   FOR 1993 AND 1996-1999	Ž	per operation	<b>a</b>	9.00		12.83		679	4.38		1,89			90'9		12.83		629	4.38		1,89			00.9	2 1177 (1 ) (1 ) (1 ) (1 ) (1 ) (1 ) (1 )		.12,83	12.83	12.83
		1	(9)	Total	(TPV)	3.39		1.17		5.40	1.37		2.16	13.48		4.23		1.50		00.0	1.12		0.35	7.20		4.32	TO ANY THE PARTY OF THE		2.24	2.24	2,24
			<u> </u>	per operation	(Ib)	59'0		0.32		10.05	0.11		66.0			59.0		0.32		10.05	0.11		0.39			0.65			0.32	0.32	0.32
			Number of	perations/Yea		10,311		7,226		1,074	25,058		11,086	54,955		13,124		9,281		0	20,478		1,805	44,687		13,406			13,854	13,854	13,854
			Operation	Type		Touch&Go		Touch&Go		Full LTO	Touch&Go		Touch&Go			Touch&Go		Touch&Go		Full LTO	Touch&Go		Touch&Go			Touch&Go			Touch&Go	Touch&Go	Touch&Go Full LTO
			Type of	Aircraft		F-14A		F-14B/D		E-2/C-2			9-Y	Total		F-14A		F-14B/D		E-2/C-2			9-Y	Total		F-14A		-	F-14B/D	F-14B/D	F-14B/D E-2/C-2
						1993	•	•	•	,	•	•		1		9661		•		<u> </u>				•		1997		<u>*</u>	<u> </u>	<u> </u>	<u> </u>
<u></u>												-			<u> </u>		<del>-</del>	E-	-7	1				<del></del>	!	1					

							•						
					AIRCRAFT	ARS 1 FEMISSIONS A	ARS 1 IRCRAFT EMISSIONS AT NALF FENTRESS	TRESS					
						FOR 1993 AND 1996-1999	1996-1999						
	Type of	Operation	Number of	(d) 200	<u>(i)</u>	XON	<b>X</b> O	02	0	805	2	P	PMIO
	Aircraft	Type	perations/Yea	per operation	Tofal	per operation		per operation	Total	per operation	Total	per operation	_
				(g)	(TPY)	(II)	(Tab)	<b>(£)</b>	(TPY)	<b>(P</b> )	(TPY)	(q)	
<u>r</u>   <u>E</u>	F-14A	Touch&Go	9,620	0.65	3.10	90'9	28.86	1.46	7.01	0.26	1.23	3.37	-1;
;   E													<del></del>
<u> </u>	F-14B/D	Touch&Go	14,673	0.32	2.37	12.83	94.10	69.0	5.05	0.37	2.70	3.64	+
Ē.												-	
	F/A-18	Touch&Go	18,503	0.20	1.87	6.04	55.89	0.79	7.33	0.20	1.82	2.62	<del></del>
								-					+
ш	E-2/C-2	Full LTO	0	10.05	00'0	6.29	00'0	15.85	0.00	0.52	0.00	00.0	+-
		Touch&Go	21,374	11.0	1.17	4.38	46.82	0.42	4.51	0.24	2.59	00.0	+
<b>.</b>	Total		64,170		8.50		225.66		23.90		8.36		
			e'Ala						V-100-00-00-00-00-00-00-00-00-00-00-00-00				<del>-</del> -
1999	F-14A	Touch&Go	9,620	59'0	3.10	6.00	28.86	1.46	7.01	0.26	1.25	3.37	
I	F-14B/D	Touch&Go	14,673	0.32	2.37	12.83	94.10	69'0	5.05	0.37	2.70	3.64	
/4	E/A_19	TomberCo	21076	050				14					-
	91.07	Lonciice	516,02	0.2.0	7,77	0.04	81.29	0.79	10.66	0.20	2.65	2.62	
<u> </u>	E-2/C-2	Full LTO	0	10.05	0.00	6.29	000	15.85	000	0.52	900	000	
<u></u>		Touch&Go	21,374	0.11	1.17	4.38	46.82	0.42	4.51	0.24	2.59	000	
	Total		72,580		9.35		251.06		27.23		61.6	} :	

Notes:

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) 1993 Touch and Go proportioned from air traffic operation records and number of interfacility flights.

(3) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).

(4) A-6 aircraft assumed decommissioned by 1997.

(s) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997). 1996 and 1998 E-2/C-2 operations assumed same as 1999 (6) Aircraft VOC reported as HC in the form CHy/x (7) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:

interfacility = low altitude operations between NAS Oceana and NALF Fentress LTO = landing and takeoff cycle GCA = ground control approach

TPY = tons per year



		E E	AKS 1 Emissions from Ground Support Equipment at NAS Oceana	n Ground	ARS 1 Support Equ	ipment at N	AS Oceans	-				
			04	2	NOX	×	00	0	SOS	7.2	Md	PM-10
		Fuel Consumption (gal/yr)	lb/1000 gal	Total (TPY)	15/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1993	Tow Tractors: (a)											
<b>Y</b> )	A/S32A-30A	0968	64.60	0.29	436.67	96'1	268.50	1.20	31.10	0.14	46.50	0.21
	TA-35	254	64.60	0.01	436.67	90.0	268.50	0.03	31.10	0.00	46.50	0.01
<b>∠</b> ∫	MD-3/A/S32A-31A	4843	64.60	0.16	436.67	1.06	268.50	0.65	31.10	0.08	46.50	0.11
<u> </u>	FA-75	17115	122 00	1,04	146.00	1.25	3250.00	27.81	5.20	0.04	8.27	0.07
V	A/S32A-42	7200	64.60	0.23	436.67	1.57	268.50	0.97	31.10	0.11	46.50	0.17
Ĕ.	JG-75	104	122.00	10.0	146.00	10'0	3250.00	0.17	5.20	0.00	8.27	0.00
K!	A/S32A-30	897	122.00	0.05	146.00	0.07	3250.00	1.46	5.20	0.00	8.27	0.00
	- 1											
14. jā	Flight Line Electric Power Un	Units	10.53	70.0	21 212	17 /	130 15	0.07	20.72	0.50	15 17	7.37
4 9	ACOA (U)	14720	37.65	400		15.4	130.13	0.27	30.73	0.30	147.41	0.32
۷]_	NC10C (0)	2180	62.64	0.00		08.0	130.13	17.0	39.73	00.00	747.47	200
Ľ	Jet Engine Start Units											
¥	A/M47A-4/NCPP-105 (b)	41932	49.23	1.03	604.17	12.67	130.15	2.73	39.73	0.83	42.47	0.89
X	A/S47A-1 (b)	712	49.23	0.02	604.17	0.22	130.15	0.05	39.73	10.0	42.47	0.02
9	GTC-85 (c)	10101	0.13	000	3.88	0.02	14.83	10.0	0.54	00.0	00.0	0.00
<u>.</u>												
<b>~</b> !	Miscellaneous: (b)			***					4		47.00	
<b>V</b> P	A/M32C-17	2105	49.23	0.05	2 8	20.0	130.15	0.14	39.73	0.04	42.47	0.04
₹.	A/M271-5	066	49.23	70.0	004.17	06.0	130.15	0.00	39.73	0.02	42.47	0.02
<u> </u>	A/M42M-2	07/	47.27	700	222.21	770	150.15	27.00	39.73 11.41	0.01	12.47	0.02
• :		Total		5.13		26.43	25.55	72.65		1.71		2.00
1996	Tow Tractors: (a)											
V	A/S32A-30A	00061	64.60	190	436.67	4.15	268.50	2.55	31.10	0.30	46.50	0.44
<del></del>	TA-35	450	64.60	100	436.67	0.10	268.50	90.0	31.10	0.01	46.50	0.01
<u> </u>	MD-3/A/S32A-31A	4843	09.50	0.16	436.67	90.	268.50	0.65	31.10	0.08	46.50	0.11
<u> !</u>	TA-75 (MOGAS)	0091	122.00	0.10	146.00	0.12	3250.00	2.60	5.20	0.00	8.27	0.01
7	A/S32A-42	0000	9 E	6.50	450.07	17.5	208.50	87.7	31.10	97.0	46.50	0.40
- IV	A/K17A-10	2900	25.00	1 O	146.00	10.0	1750.00	471	\$ 20	300	17.0 8.27	8 6
• 1		); ; ;		2					}		·	
7	Electric Power	Units						:	1	:	1	
<u>,                                    </u>	NC8A (6)	12800	49.23	0.32	604 17	3.87	130.15	0.83	39.73	0.25	42.47	0.27
<u> </u>	NC 10C (6)	3500	49.23	60'0	604.17	1.06	130.15	0.23	39.73	0.07	42.47	0.07
2	Jet Engine Start Units											
A	A/M47A-4/NCPP-105 (b)	37000	49.23	16'0	604.17	11.18	130.15	2.41	39.73	0.74	42.47	0.79
2	GTC-85 (c)	3000	0.13	0.00	3.88	0.01	14.83	0.02	0.54	0.00	0.00	0.00
	1 V											
<u> </u>	Miscellaneous: (b)	0076	*****	200	41.713	24.4	130.12	21.4	20.43	200	75.77	200
<u>,                                     </u>	A/M27T-5 (air cond.)	2350	4923	900	504.17	160	130.15	0.15	39.73	0.05	42.47	0.05
, I4	A/M42M-2 (power)	1500	49.23.	0.04	504.17	0.45	130.15	0.10	39.73	0.03	42.47	0.03
<u>, 114</u>	HLU-196	25	415.11	100	1334	uu	8480 00	110	12.11	XXX	VW V.	
					The second second	200	07.7070	11.0		0.00	13.70	00.0

The Properties of the Part   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Commentation   Comme													
Consumery (a)   Consumery (b)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c)   Consumery (c				χ	$\infty$	N	XC		0	) SC	72	Md	-10
ASSL-140			Fuel Consumption (gal/yr)	1b/1000 gal	Total (TPY)	16/1000 gal		1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASSLA-SIAA   ASS					100								
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This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This   This	A)	S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	69 5	5.20	100	8 27	10.0
The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name   The Name	TA	1-35	009	64.60	0.02	436.67	0.13	268.50	0.08	31.10	10.0	46.50	10.0
14-75   1200   12200   144   146.00   135   320   150   8277   148.55   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150   150	¥	S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	95.0	46.50	0.53
NICRA (b)   16000	TA	1.75	1200	122.00	T:04	146.00	1.25	3250.00	1.95	5.20	0.00	8.27	0.00
NCGA (b)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)     NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)   NCGA (c)	Ğ	old I in Clastic Daniel											
NCIOC (6)   NCIOC (6)   NCIOC (7)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIOC (6)   NCIO	₹   <b>≥</b>	NAME ENECTRIC FOWER OF	-	60.00	20.00	# 1 F W 2							
Miscellaneous: (b)	Z	(9) 700	0000	49.23	\$ 2 C	004.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
Micellaneous: (b)   43000   4923   111   604.17   1359   130.15   2.93   39.73   0.09   42.47     AMAZIN-2 (C. 6)   43000   4923   0.01   604.17   0.91   130.15   0.20   39.73   0.06   42.47     AMAZIN-2   3000   4923   0.07   604.17   0.91   130.15   0.20   39.73   0.06   42.47     AMAZIN-3   3000   4923   0.07   604.17   0.91   130.15   0.20   39.73   0.06   42.47     AMAZIN-3   3000   4923   0.07   604.17   0.91   130.15   0.20   39.73   0.06   42.47     AMAZIN-3   3000   4923   0.07   604.17   0.91   130.15   0.10   39.73   0.06   42.47     AMAZIN-3   23000   44.60   0.71   44.657   4.88   130.15   0.10   34.47     AMAZIN-3   23000   44.60   0.71   44.657   3.28.50   0.89   11.10   0.34   45.50     AS32A-30   AS32A-30   4.000   4923   0.39   604.17   2.42   130.15   0.35   3.973   0.16   42.47     AMAZIN-2   4000   4923   0.39   604.17   2.42   130.15   0.35   3.973   0.30   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.10   604.17   2.42   130.15   0.05   39.73   0.08   42.47     AMAZIN-3   4000   4923   0.00   604.17   0.10   39.73   0.01   42.47     AMAZIN-3   4000   4923   0.00   604.17   0.00   38.8   0.01   39.73   0.00   39.73   0.00   39.73     AMAZIN-3   4000   4923   0.00   604.17   0.00   39.73   0.00   39.73   0.00   39.73     AULU-196   2.00   604.17   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.0	1	(9)	0000	3.	2.2	71.4	181	130.15	0.39	39.73	0.12	42.47	0.13
AMAZIA-ANCPP-105 (b)         45000         4923         1111         664.17         13.59         13.015         2.93         39.73         0.89         42.47           AMAZIA-ANCPP-105 (b)         3500         0.13         0.00         37.88         0.01         14.83         0.03         0.54         0.00         0.00           Miscellineous: (b)         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIA-S         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIA-S         1600         49.23         0.04         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIA-S         1600         49.23         0.04         604.17         0.94         130.15         0.00         39.73         0.06         42.47           AMAZIA-S         1600         49.23         0.04         64.67         0.71         436.67         3.20         0.09         31.10         0.34         45.50           AS32A-30         2600         64.60         <	Jet	t Engine Start Units											
CTC-85 (c)   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All Color   All	AA	M47A-4/NCPP-105 (b)	45000	49.23		604.17	13.59	130.15	7 93	30 73	08.0	17.17	0.02
Mixeellaneous: (b)         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZYL-S         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZYL-S         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           HUL-18G         20         49.23         0.04         604.17         0.91         130.15         0.20         39.73         0.06         42.47           HUL-18G         20         49.23         0.04         604.17         0.03         115.11         0.00         42.47           Town Tractors (a)         7         415.11         0.00         20.31         4.86         2.88.30         0.09         11.30         0.03         42.47           AS32A-30         48.00         0.71         436.67         5.03         258.50         0.08         31.10         0.34         45.50           AS32A-42         2.800         64.60         0.74         436.67         5.03         268.50         3.09         31.10	<u>15</u>	rc-85 (c)	3500	0.13	00.0	3.88	0.0	14.83	0.03	0.54	000	7.7.7 U U	0.30
Miscellameous: (b)         49.23         0.07         664.17         0.99         130.15         0.20         39.73         0.06         42.47           AMAZTT-5         3000         49.23         0.07         664.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZTT-5         1600         49.23         0.07         664.17         0.48         130.15         0.10         39.73         0.06         2.47           HUU-196         2.0         415.11         0.00         623.31         0.00         88990         0.00         13.70         12.47           HUU-196         2.0         415.11         0.00         223.31         0.00         88890         0.00         13.70         13.70         13.70           AS32A-30 A (NOCAS)         2.00         44.60         0.71         43.67         0.13         23.60         0.01         45.50           AS32A-30 A (NOCAS)         2.00         64.60         0.74         436.67         5.02         2.85         31.10         0.34         45.50           AS32A-42         2.3000         64.60         0.74         436.67         5.02         288.30         0.08         39.73 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>3.</td></t<>												2	3.
AMAZOC-17         3000         49.23         0.07         664.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIA-5         3000         49.23         0.07         664.1         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIA-5         1600         49.23         0.04         604.17         0.48         130.15         0.0         39.73         0.06         42.47           HUU-196         20         415.11         0.00         223.31         0.04         185.95         0.00         115.1         0.00         13.70           HUU-196         20         415.11         0.00         223.31         0.04         187.35         13.01         0.00         13.70         13.70         13.70           AK31A-30         600         44.50         0.71         436.67         0.13         268.50         5.05         31.10         0.34         46.50           AK33A-30         600         44.60         0.74         436.67         5.02         268.50         3.09         31.10         0.34         45.50           AK33A-42         600         44.60         0.74         436.67 <td>Mi.</td> <td>scellaneous: (b)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>:</td>	Mi.	scellaneous: (b)											:
AMAZIT-S         3000         4923         0.007         66417         0.91         130.5         0.00         42.47           H.D.HQAN-Z         20         4923         0.007         60417         0.008         130.15         0.00         95.73         0.00         42.47           H.D.HQAN-Z         20         457         223.31         0.00         88899         0.09         1151         0.00         13.70           IRDHAM-Z         Town Practions: (a)         Toil         4.57         223.31         0.00         88899         0.09         1151         0.03         42.47           AS32A-30         Good         64.60         0.71         4.86         2.88.50         2.88.50         3.20         0.01         4.85           AS32A-30         AS32A-30         600         64.60         0.71         436.67         5.02         2.88.50         3.10         0.34         46.50           AS32A-30         AS32A-30         600         64.60         0.74         436.67         5.02         268.50         3.10         0.31         46.50           ANS3A-30         600         64.60         0.74         436.67         5.02         268.50         3.10         0.31	A/	M32C-17	3000	49.23	0.07	604.17	16'0	130.15	0.20	39.73	90.0	42.47	0.06
H.U. 196	<b>\</b>	M27T-5	3000	49.23	0.07	604.17	16:0	130.15	0.20	39.73	0.06	42.47	0.06
HUL-196	A	M42M-2	0091	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
Tow Tractiors (a)         101al         4.57         34.01         18.73         2.20           AS32A-30A (MOGAS)         22000         64.60         0.71         436.67         4.80         268.50         2.95         31.10         0.34         46.50           AS32A-30A         3500         122.00         0.21         146.00         0.26         3250.00         3.69         3.20         0.01         46.50           AS32A-30         2300         64.60         0.02         436.67         0.13         268.50         3.09         31.10         0.34         46.50           AS32A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.36         46.50           AS32A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.36         46.50           ROSA ASSAA-42         23000         64.00         67.1         436.7         42.47         42.47         46.50         46.50         46.50         46.50         46.50         46.21         46.47         46.47         46.47         46.47         46.47         46.47         46.47         46.47	<b>#</b> ;	70-196	20	415,11	000	223.31	00'0	8589.90	0.09	11.51	00.0	13.70	00.0
ASSIA-30		l.	lotal		4.57	100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co. 100 Co	34.01		18.73		2.20		2.66
12.00		W Iractors: (a)	2000										
2500         64.60         0.21         146,00         0,26         3520,00         5.69         5.20         0.01         8.27           23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.01         46.50           c Power Units         16000         49.23         0.39         604.17         4.83         130.15         1.04         39.73         0.32         42.47           8000         49.23         0.20         604.17         4.83         130.15         1.04         39.73         0.16         42.47           mits         105 (b)         47000         49.23         0.20         604.17         2.42         130.15         0.52         39.73         0.16         42.47           mits         105 (b)         47000         49.23         1.16         604.17         14.20         130.15         3.05         39.73         0.06         0.00         0.00           4000         49.23         1.16         604.17         14.83         0.03         0.54         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         <	NA	532A-30A (MOGAS)	3500	04.00	1/0	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
C Power Units         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD         C A FOOD	TA	-35	2000	64.60	1770	140.00	07.0	3250.00	5.69	5.20	0.01	8.27	0.01
c Power Units         16000         49.23         0.39         604.17         4.83         130.15         1.04         39.73         0.32         42.47           mits         8000         49.23         0.20         604.17         2.42         130.15         0.52         39.73         0.16         42.47           mits         47000         49.23         0.16         604.17         14.20         130.15         3.06         39.73         0.09         42.47           105 (b)         47000         49.23         1.16         604.17         14.83         0.03         0.54         0.00         0.00           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         40.00         49.23         0.04         604.17         0.08         130.13         0.09         11.51         0.09         <	A/S	\$32A-42	23000	64.60	0.74	436.67	5.02	268 50	3.00	31.10	0.01	46.50	0.0I Ö §3
16000   4923   0.39   604.17   4.83   130.15   1.04   39.73   0.32   42.47     16000   4923   0.20   604.17   2.42   130.15   0.52   39.73   0.16   42.47     105 (b)   47000   49.23   1.16   604.17   14.20   130.15   3.06   39.73   0.93   42.47     105 (b)   47000   49.23   0.10   604.17   121   130.15   0.26   39.73   0.08   42.47     1000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     1000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     1000   49.23   0.04   604.17   1.21   130.15   0.26   39.73   0.03   42.47     1000   49.23   0.04   604.17   0.48   130.15   0.10   39.73   0.03   42.47     1000   49.23   0.04   604.17   0.06   8589.90   0.09   11.51   0.00   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51   0.00   13.70     11.51	Ellis	Oht I mo Glodeno Douge Ile											66.0
16000   4923   0.39   604.17   4.83   130.15   1.04   39.73   0.32   42.47     8000   4923   0.20   604.17   2.42   130.15   0.52   39.73   0.16   42.47     105 (b)   47000   49.23   1.16   604.17   14.20   130.15   3.06   39.73   0.93   42.47     4000   4923   0.10   604.17   121   130.15   0.26   39.73   0.08   42.47     4000   4923   0.10   604.17   121   130.15   0.26   39.73   0.08   42.47     4000   4923   0.04   604.17   121   130.15   0.26   39.73   0.08   42.47     1600   4923   0.04   604.17   0.48   130.15   0.10   39.73   0.03   42.47     20   415.11   0.00   223.331   0.00   8589.90   0.09   11.51   0.00   13.70		gui Line Liecuric I Ower On		***   3 %   4 ***   4					:				
8000         49.23         0.20         604.17         2.42         130.15         0.52         39.73         0.16         42.47           mits         47000         49.23         1.16         604.17         14.20         130.15         3.06         39.73         0.93         42.47           105 (b)         47000         49.23         0.10         604.17         14.20         130.15         0.03         0.54         0.00         0.00           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         49.23         0.04         604.17         0.48         130.15         0.10         39.73         0.08         42.47           20         415.11         0.00         223.331         0.00         8589.90         0.09         11.51         0.00         13.70	NC	.8A (b)	16000	49.23	0.39	604.17	4.83	130.15	104	39 73	Ñ 37	47.47	0.34
nits         47000         49.23         1.16         604.17         14.20         130.15         3.06         39.73         6.93         42.47           4000         49.23         0.13         0.00         3.88         0.01         14.83         0.03         0.54         0.00         0.00           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         49.23         0.04         604.17         1.21         130.15         0.10         39.73         0.03         42.47           20         415.11         0.00         223.331         0.00         8589.90         0.09         11.51         0.00         13.70	NC	10C (b)	8000	49.23	0.20	604.17	2.42	130.15	0.52	39.73	0.16	42.47	0.17
105 (b)         47000         4923         1.16         604.17         14.20         130.15         3.06         39.73         6.93         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.09         0.00           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         415.11         0.00         223.331         0.00         8589.90         0.09         11.51         0.00         13.70	Int	Fnoine Stort Units									· ·		
3500         0.13         0.00         3.88         0.01         14.83         0.03         0.54         0.05         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         415.11         0.00         223.331         0.00         8589.90         0.09         11.51         0.00         13.70	AA	M47A-4/NCPP-105 (b)	47000	49.23	1 16	604 17	14.00	130 15	3.06	20 72	0.00	15. 65	
4000         4923         0.10         60417         1.21         130.15         0.26         39.73         0.08         42.47           4000         4923         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         0.48         130.15         0.10         39.73         0.08         42.47           20         415.11         0.00         223.331         0.00         8589.90         0.09         11.51         0.00         13.70	15	C-85 (c)	3500	0.13	000	3.88	100	14.83	0.00	0.54	0.00	42.47	00.1
4000         4923         6.10         60417         1.21         130.15         0.26         39.73         0.08         42.47           4000         4923         0.10         60417         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         60417         0.48         130.15         0.10         39.73         0.08         42.47           20         415.11         0.00         223.31         0.00         8589.90         0.09         11.51         0.00         13.70											200	200	3.
7         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         0.48         130.15         0.10         39.73         0.03         42.47           20         415.11         0.00         223.31         0.00         8589.90         0.09         11.51         0.00         13.70	Mis	scellaneous: (b)											
4000     49.23     0.10     604.17     121     130.15     0.26     39.73     0.08     42.47       1600     49.23     0.04     604.17     0.48     130.15     0.10     39.73     0.03     42.47       20     415.11     0.00     223.31     0.00     8589.90     0.09     11.51     0.00     13.70	₽\	M32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
1600 49.23 0.04 604.17 0.48 130.15 0.10 39.73 0.03 42.47 2.0 415.11 0.00 223.31 0.00 8589.90 0.09 11.51 0.00 13.70	¥¥	427T-5	4000	49.23	0.10	604.17	121	130.15	0.26	39.73	80.0	42.47	0.08
20 415.11 0.00 223.31 0.00 8589.90 0.09 11.51 0.00 13.70	A/N	M42M-2		49,23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
	]	0-196		415.11	.000	223.31	<b>UUU</b>	00 00 00	000				-



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ble A-5	NRS 1	art Equipment at NAS Ocean
Ta	AR	Emissions from Ground Sunnert Equipment at NAS O

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		Fuel Consumption (gal/yr)	15/1000 gal	Total (TPY)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	lb/1000 gal	Total (TPY)
6661	Tow Tractors: (a)											
	A/S32A-30A (JP-5)	22400	64.60	0.72	436.67	4.89	268.50	3.01	5.20	90.0	8.27	0.09
	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
	TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	5.20	0.00	8.27	0.00
	A/S32A-42	23000	64.60	0,74	436.67	5.02	268.50	3.09	5.20	90.0	8.27	0.10
	THE REPORT OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE											
	Flight Line Electric Power Units	its										
	NC8A (b)	16000	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
	NC10C (b)	8000	49.23	0.20	604.17	2.42	130.15	0.52	39.73	0.16	42.47	0.17
	Jet Engine Start Units											
	A/M47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	1.00
	GTC-85 (c)	3500	0.13	000	3.88	0.01	14.83	0.03	0.54	0.00	0.00	0.00
								-		:		
	Miscellaneous: (b)										:	
	A/M32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
	A/M27T-5	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
	A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
	HLU-196	20	415.11	00'0	223.31	0.00	8589.90	0.09	11.51	0.00	13.70	0.00
		Total		3.69	A. C. C. C. C. C. C. C. C. C. C. C. C. C.	34.66		17.22		1.73		1.92

Footnotes:

E-75

(a) Emission factors from AP-42 Volume II for gasoline-powered wheeled tractor for TA-75, IG-75, & A/S32A-30 and diesel-powered wheeled tractors for all others.
(b) Emission factors from AP-42 Volume I for Uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301..
(c) Emission factor from USEPA 1992 for aircraft auxilliary power units.

Notes:
(1) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(2) Conversion from lb/MMBtu assuming heating value for JP-5 of 137,000 Btu/gallon.

					DAIL TO THE BING THE LESS THE								
Engine (Aircraft)	Power Setting (1)	Time in Power Setting (1)	Fuel Flow (Ib/min)		(اھ	Emission Factor (1b /1000 lb fuell/eng)	(Jul.)			(lb/si	Emission Rates	S n-nn)	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon
		(minutes)		VOC (2)	NOx	00	802	PM10	VOC (2)	NOX	93	802	PM10
IF30-P-412A	Low Power	i c											
(r-14A)	Idic	00.7	15.5	31,42	3.22	55.51	0.40	8.96	3.37	0.35	5.96	0.04	96.0
_1	75%	12.00	71.7	1.48	10.74	3.43	0.40	5.70	1.27	9.24	2.95	0.34	4.90
	Total								4.65	9.59	8.91	0.39	5.87
- !	U. L. D.												
•	Talle Tower	10.00	16.3	4	*	19 99	9	20.0			21.2		-
i	765 <u>L</u>	25.00	717	76.10	3,77	14.5	0.40	8.96	4,81	0.49	8.49	0.06	1.37
	100% (Mill)	00.07	117.5	0 1 4 0 0 7 7	10.74	3.43	0.40	3.70	2.63	19.25	6.15	0.72	10 22
1	A/B (Z5)	4.00	796.7	0.20	3.2	10.77	0.40	0.00	0.64	50.62	70'1 24 37	1.57	3.30
<u> </u>	Total	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s							9.00	58.04	50.58	2.52	15.09
F110-GE-400	Low Power												
(F-14B/D)	Idle	5.00	19.5	3.65	2,77	16.60	0.40	12.38	0.36	0.27	1.62	0.04	1.21
	75%	12.50	133.0	0.26	19'61	0.76	0.40	4.30	0.43	32.60	1.26	29.0	7.15
	Total								0.79	32.87	2.88	0.70	8.36
	High Power												
	Idle	10.00	19.5	3.65	2.77	16.60	0.40	12.38	0.71	0.54	3.24	0.08	2.41
	75%	20.00	133.0	0.26	19.61	0.76	0.40	4.30	0.69	52.16	2.02	1.06	11.44
	IRP	15.00	195.3	0.40	28.63	0.84	0.40	2.81	717	83.87	2.46	1.17	8.23
i_	A/D(Max)	3.	945.0	613	77.4	23.12	0.40	0.00	0.49	34.85	87.39	1.51	0.00
1.52.P.8R	I OUR								3.07	171.43	95.11	3.83	22.08
(9-V)	Idle	15.00	11.3	78 67	1.70	37 53	070	200	CE 0	0.30	10.04	100	10
	78-82%	10.00	72.0	190	10.10	3.00	0.40	000	0.48	7.27	2 16	0.29	800
•	Total			200					8.80	7.58	13.00	0.36	
- 1						-							-
	High Power	) (1)											
	idle	15.00	11.3	48.96	1.79	63.78	0.40	0.00	8.30	0.30	10.81	0.02	00.0
	%-87%	0.00	0.77	0.67	10.10	3.00	0.40	0.00	0.24	3.64	1.08	0.14	0.00
. !	34-100%	90.5	8.771	∴ 0.93 ∴	13,05	0.71	0.40	0.00	0.91	12.82	0.70	0.39	0.00
F404-GE-400	I Otal							:	9,45	16.76	12.59	09.0	0.0
(F/A-18)	Idle	6.50	10.4	58.18	1.16	137.34	0.40	12.38	393	0.08	9.28	0.03	0.84
-	29%	3.50	0.601	0.35	14.80	1.09	0.40	9 10	0.13	\$ 65	0.42	0.15	2 33
•	Total					-			4.07	5.72	9.70	0.18	3.16
	A CONTRACTOR OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY O							i					
•		1									:		
	Idle	13.00	10.4	58.18	1.16	137.34	0.40	12.38	7.87	0.16	18.57	0.03	1.67
	76%	80.50	0.601	0.35	14.80	1.09	0.40	4.00	0.32	13.71	1.01	0.37	3.71
i	3	00.0	143.1	0,31	25.16	1.05	0.40	2.81	0.22	18.00	0.75	0.29	2.01
	A/K	95	473.3	ファイ かんきゅうファン									

(1) Power setting and time in power setting for F-14 A, F-14B/D, F/A-18 aircraft, and A-6 provided by AESO and COMNAVAIRLANT.

(2) Aircraft VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(4) Aircraft VOC = volatile organic compounds

(5) Shaded areas indicate pollutants setting

(6) To a carbon monoxide

(7) Shaded areas indicate power (same as Military)

(7) Shaded areas indicate power (same as Military)

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

						Table A-7 ARS 1							
			EMISSIO	NS FROM SING	LE ENGINE	IE IN-FRAME MAINTEN FOR 1993 AND 1996-1999	VINTENANCE 96-1999	EMISSIONS FROM SINGLE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	AS OCEAN	_			
	Type of	Run-up mode	Number of	lka:	<b>(E)</b>	XON	×	03		202		PMIO	10
	Aircraft (Engine) and		•	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total (TPV)	Lb per Single	Total	Lb per Single	Total
1993	F-14A (TF30-P-412A)	Low Power	9.617	4.65	22.34	9.59 J		8.91	42.83	0.39	1.86	5.87	28.21
	80	High Power	274	9.00	1.23	58.04	7.94	50.58	6.92	2.52	0.35	15.09	2.06
													1
	F-14B/D (F110-GE-400)	Low Power	3,365	0.79	1.33	32.87	55.30	2.88	4.85	0.70	1.18	8.36	14.06
	. 55	High Power	921	3.07	0.27	171.43	15.11	95.11	8.38	3.83	0.34	22.08	1.95
									1	3		je je	
	A-6 (J-52-P-8B)	Low Power	10,320	8.80	45.42	7.58	39.09	13.00	80.79	0.36	1.84	00:0	0.00
	86	High Power	292	9.45	1 38	16.76	2.45	12.59	1.84	09:0	0.09	00:00	0.00
				Total	71.97		165.99		131.90		5.65		46.27
9661	F-14A (TF30-P-412A)	Low Power	11,180	4.65	25.96	9.59	46.09	8.91	42.83	0.39	1.86	5.87	28.21
	93	High Power	318	00'6	1.43	58.04	7.94	50.58	6.92	2.52	0.35	15.09	7
	<u> </u>												. !
	F-14B/D (F110-GE-400)	Low Power	4,221	0.79	1.66	32.87	<b>55.30</b>	2.88	4.85	0.70	1.18	8.36	14.06
	69	High Power	221	3.07	0.34	171.43	15.11	95.11	8.38	3.83	0.34	22.08	1.95
													. !
	A-6 (J-52-P-8B)	Low Power	1,680	0.13	0.11	5.65	4.74	0.42	0.35	0.15	0.13	2.33	1.95
	14	High Power	48	0.22	0.01	18.00	0.43	0.75	0.02	0.29	0.01	2.01	0
	-												!
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	0.97	0.18	0.02	3.16	0.32
	12	High Power	46	8.54	0.21	40.60	66.0	42.21	1.03	1.09	0.03	7.39	0.18
				Total	30.13		131.19		65.36		3.91		. <u>4</u>
1001	F-14A (TF30-P-412A)	Low Power	11.420	4.65	26.52	9.59	54.74	8.91	50.86	0.39	2.2	5.87	33.
· ·	95	1	325	00'6	1.46	58.04	9.43	50.58	8.22	2.52	0.41	15.09	2.45
								-					
	F-14B/D (F110-GE-400)	Low Power	6,302	67.0	2.48	32.87	103.57	2.88	80.6	0.70	2.22	8.36	26.33
	103	High Power	330	3.07	0.51	171.43	28.30	95.11	15.70	3.83	0.63	22.08	3.65
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	0.97	0.18	0.02	3.16	0.32
	12	High Power	49	8.54	0.21	40,60	0.99	42.21	1.03	1.09	0.03	7.39	0
								THE REAL PROPERTY AND PERSONS NAMED IN COLUMN 1 IS NOT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER, BUT THE OWNER,		+		and the second second	Pie IN IN

AirCraft Railer   Mumber of AirCraft Railer   Mumber of AirCraft Railer   Mumber of AirCraft Railer   Mumber of AirCraft Railer   Mumber of AirCraft Railer   Mumber of AirCraft   Run-upsyr Digitis Railer   Liber Single   Total   Liber Single Railer   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Liber Single   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total				EMISSIONS FROM SING	SLE ENGINI F	ARS I ARS I M SINGLE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	INTENANCE 96-1999	RUN-UPS AT N	AS OCEANA				
Number of Aliccaft   Single Engine Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Lib per Single   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Tot	Type of	Run-up mode		\$ 4		ON	X	Ω		208		Md	10
F-14A (TF30-P412A)   Low Power   6,010   4,63   13.96   9,39   28.84   8.91   26.77   0.39   0.00   5.87     F-14B/D (F110-GE-400)   Low Power   5,735   0.79   0.77   38.04   4.56   95.38   8.55   0.70   0.00   5.87     FA-18 (F404-GE-400)   Low Power   7,721   4.07   1.570   4.52   40.50   9.34   4.56   9.51   101.61   10.95     F-14B/D (F110-GE-400)   Low Power   7,721   4.07   4.53   13.56   40.50   9.35   4.25   0.77   0.39   0.69   3.16     F-14A (TF30-P-412A)   Low Power   7,721   4.65   13.56   9.35   13.56   9.35   2.88   8.55   0.70   0.39   0.65   3.16     F-14A (TF30-P-412A)   Low Power   7,721   4.65   13.56   9.35   2.35   0.22   15.09     F-14B/D (F110-GE-400)   Low Power   7,721   4.65   13.56   0.77   38.04   4.56   0.38   8.55   0.70   0.39   1.16   5.87     F-14B/D (F110-GE-400)   Low Power   1,731   3.07   0.38   3.54   3.28   4.35   0.38   4.32   0.35   0.35   0.35   0.30     F-14B/D (F110-GE-400)   Low Power   1,230   4.07   2.28   3.72   3.214   0.70   3.47   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.28   3.72   3.214   0.70   3.47   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.28   3.72   3.214   0.70   3.47   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.28   3.72   3.214   0.70   3.47   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.28   3.72   3.214   0.70   3.47   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   6600   8.34   2.28   4.050   13.35   4.221   14.11   14.11   1.01   0.35   7.35     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.88   3.72   3.214   4.217   1.19   0.18   1.01   3.15     F-14B/D (F10-GE-400)   Low Power   1,230   4.07   2.88   4.050   13.35   4.221   1.1412   1.05   0.35   7.35     F-14B/D (F10-GE-400)   Low Power   1,230   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1	_		Single Engine Run-ups/yr	Lb per S Engine Ri	Total	Lb per Single Engine Run-un	Total	Lb per Single	Total	Lb per Single	1	Lb per Single	Total
F-14A (TF30-F-412A)   Low Power   5,936   0,79   0,74   0,35   0,75   0,587   0,75   0,587   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75   0,75	2		A COLUMN TO A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PART	000 000 A 07 X02				dn iinx aii.		rugiuc van-ah	(ILI)	Lugine Kun-up	J
Fi-14BD (FI10-GE-400)   Low Power   171   9.00   0.77   58.04   4.96   50.58   4.32   2.52   0.00   15.09     Fi-14BD (FI10-GE-400)   Low Power   5.936   0.79   2.34   32.87   26.69   95.11   14.81   3.83   0.60   22.08     Fi-14BD (FI10-GE-400)   Low Power   7.721   4.07   15.70   5.72   22.10   9.70   37.45   0.18   0.69   3.16     Fi-14A (TE-400)   Low Power   7.721   4.07   1.96   5.32   4.07   1.96   0.75   2.34   4.05   4.05   4.05     Fi-14BD (FI10-GE-400)   Low Power   6.010   4.63   13.96   9.55   22.10   9.70   37.45   0.18   0.69   3.16     Fi-14BD (FI10-GE-400)   Low Power   5.936   0.79   2.44   32.87   97.56   95.11   4.81   3.83   0.60   22.08     Fi-14BD (FI10-GE-400)   Low Power   11.230   4.07   22.83   5.72   32.14   4.81   3.83   0.60   22.08     Fi-14BD (FI10-GE-400)   Low Power   11.230   4.07   22.83   5.72   32.14   4.81   3.83   0.60   22.08     Fi-14BD (FI10-GE-400)   Low Power   11.230   4.07   22.83   5.72   32.14   4.181   3.83   0.60   3.36   7.39     Fi-14BD (FI10-GE-400)   Low Power   11.230   4.07   22.83   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.38   4.050   13.3	F-14A (TF30-P-412A)	Low Power	6,010	4.65	13.96	6.6	28.81	8.91	76 77	0.30	000	5.07	-
F-14B/D (F110-GE-400)         Low Power         5,936         0.79         2.34         32.87         97.36         2.88         8.55         0.70         2.09         8.36           97         High Power         311         3.07         6.48         171.43         26.69         95.11         14.81         3.83         0.60         22.08           F/A-18 (F404-GE-400)         Low Power         7,721         4.07         15.70         4.06         9.71         1.09         0.53         7.39           F-14A (TF30-F412A)         Low Power         6,010         4.63         1.36         9.59         2.24         9.71         1.09         0.53         7.39           F-14A (TF30-F412A)         Low Power         6,010         4.63         1.39         9.59         2.88         8.91         26.77         0.39         1.16         5.87           F-14A (TF30-P412A)         Low Power         6,010         4.63         1.356         9.59         2.88         8.55         0.77         0.20         1.50           F-14A (TF30-P412A)         Low Power         1/71         9.00         0.77         3.28         4.36         0.67         2.52         0.22         15.09           F/A-18 (F404-	90	High Power	171	90.6	0.71	58.04	4.96	50.58	4.32	2.52	000	15.00	- [
Figh   Figh   Fower   5,336   6,79   2.34   32.87   56.69   55.11   14.81   3.83   0.70   2.09   8.36   8.36   14.81   3.83   0.60   22.08   14.81   14.81   3.83   0.60   22.08   15.08   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   15.70   16.61   10.61   10.9   0.25   13.6   13.6   15.70   10.60   15.70   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61   10.61								The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa				2	- ;
FA-18 (F404-GE-400)   Low Power   7,721   4,07   5,72   22,10   9,71   14,81   3,83   0,60   22,08   3.16   132   High Power   7,721   4,07   5,72   22,10   9,70   3,745   0,18   0,69   3,16   139   139   1,16   1,109   1,09   1,09   1,10   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09   1,09	F-14B/D (F110-GE-400)		5,936	0.79	2.34	32.87	97.56	2.88	8.55	0.70	2.00	35.8	Ϋ́C
F/A-18 (F404-GE-400)   Low Power   7,721   4,07   15.70   5,72   22.10   9.70   37.45   0.18   0.659   3.16     132	97	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09:0	22.08	5 6
F/A-18 (1404-GE-400)   Low Power   7/721   4,07   15,70   5,72   22.10   9,70   37.45   0.18   0.69   3.16   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.3	E/4 18 /F161 CIF 100%		1										\$
F-14A (TF30-P-412A)   Low Power   460   8.34   1.96   40.60   9.34   42.21   9.71   1.09   0.25   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.39   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30   7.30	F/A-18 (F404-GE-400)	Low Power	7,721	4.07	15.70	2.2	22.10	9.70	37.45	0.18	69.0	3.16	61
F-14A (TF30-P-412A)         Low Power         6,010         4,65         5,59         2,59         2,88         8 91         26.77         0.39         1.16         5 87           F-14B/D (F10-GE-400)         Low Power         171         9,00         0.77         38.04         4,96         50.58         4,32         2,52         0,22         15.09           F-14B/D (F10-GE-400)         Low Power         5,936         0.79         2,34         32.87         97.36         0,70         2,07         2,09         8,36           F/A-18 (F404-GE-400)         Low Power         11,230         4,07         22,83         3,71         32,14         9,70         54,47         0,18         1,01         3,16           192         High Power         669         8,54         2,85         40,60         13,36         40,21         14,12         109         0,36         7,39	132	High Power	460	8.54	1.96	40.60	9.34	42.21	9.71	60.1	0.25	7 39	<u>:</u> :-
F-14A (TF30-P-412A)         Low Power         6,010         4,65         13.96         5,59         28.81         8.91         26.77         0.39         1.16         5.87           50         High Power         171         9,00         0.77         5.39         2.38         4.32         2.52         0.22         15.09           F-14B/D (F110-GE-400)         Low Power         5,936         0.79         2.34         32.87         97.56         2.88         8.55         0.70         2.09         8.36           F/A-18 (F404-GE-400)         Low Power         11,230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           192         High Power         669         8.54         2.85         40.60         13.58         42.21         14.12         1.09         0.36         7.39				Total	35.21		189,46		19.101		3.63		61.
F-14A (1F30-P-412A) Low Power 6,010 4,655 13.96 9,556 28.81 8.91 26.77 0.39 1.16 5.87 58.7	F										: ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !		1
High Power         171         9,00         0,77         58,04         4,96         50.58         4,32         2,52         0,22         15.09           Low Power         5,936         0,79         2,34         22,87         97.56         2,88         8,55         0,70         2,09         8,36           High Power         11,236         4,07         22,83         5,72         32,14         9,70         54,47         0,18         1,01         3,16           High Power         669         8,54         2,85         40,60         13.38         42,21         14,12         1,09         0,36         7,39		Low Power	6,010	4.65	13.96	65'6	28.81	16.8	26.77	0.39	1.16	5 87	17
Low Power         5,936         0.79         2.34         32.87         97.56         2.88         8.55         0.70         2.09         8.36           High Power         311         3.07         0.48         171.43         26.69         95.11         14.81         3.83         0.50         22.08           Low Power         11,230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           High Power         669         8.54         2.85         40.60         13.38         42.21         14.12         1.09         0.36         7.39	20	High Power	171	00'6	0.77	58.04	4.96	50.58	4.32	2.52	0.22	15.09	-
Low Power         5,936         0.79         2.34         32.87         97.36         2.88         8.55         0.70         2.09         8.36           High Power         311         3.07         0.48         171.43         26.69         95.11         14.81         3.83         0.60         22.08           Low Power         11.230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           High Power         669         8.54         2.85         40.60         13.58         42.21         14.12         1.09         0.36         7.39													
High Power         311         3.07         0.48         171.43         26.69         95.11         14.81         3.83         0.60         22.08           Low Power         11,230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           High Power         669         8.54         2.85         40.60         13.58         42.21         14.12         1.09         0.36         7.39		Low Power	5,936	ł	2.34	32.87	97.56	2.88	8.55	0.70	2.09	8 3.K	24
Low Power         11,230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           High Power         669         8.54         2.85         40.60         13.58         42.21         14.12         1.09         0.36         7.39		High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09'0	22.08	, r
Low Power         11,230         4.07         22.83         5.72         32.14         9.70         54.47         0.18         1.01         3.16           High Power         669         8.54         2.85         40.60         13.58         42.21         14.12         1.09         0.36         7.39													
High Power 669 8.54 2.85 40.60 13.58 42.21 14.12 1.09 0.36 7.39	F/A-18 (F404-GE-400)	Low Power	11,230	4.07	22.83	5.72	32.14	9.70	54.47	0.18	1.01	3.16	17
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	192	High Power	699	8.54	2.85	40.60	13.58	42.21	14.12	1.09	0.36	7.39	24

(1) Number of maintenance run-ups for F-14A, F-14B/D, and F/A-18 aircraft in 1997 and 1999 are from Wyle (1997). 1993, 1996, and 1998 maintenance run-ups were scaled from 1997 based on number of aircraft stationed at NAS Oceana. (2) Maintenance run-ups for A-6 based on actual 1993 data. 1996 data scaled using 1993 data. (3) Aircraft VOC reported as HC in the form CHy/x (3) Aircraft VOC reported as HC in the form CHy/x (4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         VOC         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIII         NOS         FMIIIII         NOS         FMIIIII         NOS         FMIIIII         NOS         FMIIIII         NOS         FMIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Actor ( ) property and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor ( ) and actor (			İ		STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS I FOR 1993 AND 1996-1999	i able A-8 JRCE EMISSIONS AT NAS FOR 1993 AND 1996-1999	S AT NAS OCEA! 196-1999	NA - ARS 1					
Type         VOC         NOS         CO         SOI         PM10         VOC         NOS         CO         SOI           Type         Vouc         NOS         831         22.09         3.84         0.78         23.76         3.63         0.78         29.13         7.52         23.76           Sumresi         1,13         32.32         8.31         22.09         3.84         0.78         23.76         3.63         0.78         29.13         7.52         23.76           sing         0,71         8.67         1.87         0.57         0.61         2.11         2.78         2.15         23.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75         3.75 <th>County</th> <th>II.</th> <th>1993</th> <th></th> <th></th> <th></th> <th>9661</th> <th></th> <th></th> <th></th> <th></th> <th>1997</th> <th></th> <th></th>	County	II.	1993				9661					1997		
113   33.32   8.31   22.09   3.84   0.78   2913   7.52   23.76   3.53   0.78   29.13   7.52   23.76     0.71   8.67   1.87   0.57   0.61   0.71   8.67   1.87   0.57   0.61   2.11   2.787   7.27   3.77     0.72   3.56   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50   0.50     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72     0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72   0.72	Tyne		02	202	PM10		S.	202	PM10			_ B	202	PM10
string         3.2.6         1.87         0.57         0.57         0.61         2.11         2.18         2.18         2.18         2.18         2.11         2.11         2.11         2.11         2.11         2.18         7.27         3.77           string         3.2.6         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61         2.11         2.78         3.77         3.77           Handling         3.2.6         1.88         2.2.13         3.007         1.01         2.78         3.75         2.599         3.988         1.23           Handling         6.56         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	Stationary Sources:			,		23	31	24.84	3.63			7 53	77.76	167
string         3.26         19.89         2.603         0.94         2.28         2.53         22.13         3.007         1.01         2.78         3.15         2.99         3.988         1.23           Handling         6.66         19.89         2.603         0.90         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	Boilers	1,13	8.31	22.09	3.84		76.7		50.0			*	2 1	3
string         3.56         19.89         26.03         6.54         2.98         2.53         22.13         30.07         1.01         2.78         3.75         29.99         39.88         1.23           Handling         6.66         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00	Generators			0.57	19.0			0.57	19.0	2.11		7.27	3.77	2.21
string         3.56         19.89         26.03         0.94         2.28         2.95         23.75         23.99         39.88         1.23           Handling         d.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00											23			4
Handling 6.66 6.00 0.00 0.00 0.00 0.00 0.00 0.0	Engine Testing	19.89		0.94	2.28		30.07	1.01	2.78		6.2	39.88	1.25	3.71
Handling G66 0.00 0.00 0.00 0.00 0.00 0.00 0.00							78537				41 41 81			:0
ation         19.35         0.00         0.00         0.00         4.67         0.00         0.00         0.00           inn         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0	JP-5 Fuel Handling		00:00	00.00	0.00			0.00	0.00			0.00	00.0	0.00
arion         15.35         6.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         <							ES.					ie ie	ic ic	10
19.30         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <t< td=""><th>Service Station</th><td></td><td>00.00</td><td>00.00</td><td>00.0</td><td>4.46</td><td>000</td><td>0.00</td><td>0.00</td><td>4)</td><td>X</td><td>00.00</td><td>900</td><td>00.0</td></t<>	Service Station		00.00	00.00	00.0	4.46	000	0.00	0.00	4)	X	00.00	900	00.0
19,30         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00         0,00 <t< td=""><th></th><td></td><td>327</td><td></td><td></td><td></td><td>100 A</td><td></td><td></td><td></td><td></td><td></td><td>io io</td><td></td></t<>			327				100 A						io io	
ition: <u>0.00, 0.00 0.00 0.00 0.00 0.00 0.00 0.</u>	Painting		0.00	00.00	0.00	8.00 B	0.00	0.00	00.0			80	00.0	00.0
1000         6,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000         0,000			×.								Ã	ic ic		60
44.4         60.88         36.21         23.60         6.73         22.65         59.93         39.46         25.34         7.02         25.85         86.99         34.67         28.78	Construction:		0.00	00.00	00.0	0.00	0.00	00:00	00.0			0.00	00.0	0.00
444 60.88 36.21 23.60 6.73 22.65 59.93 39.46 25.34 7.02 25.85 86.99 54.67 28.78							1.3					-	1	)1 11
	Tatel		36.21	23.60	6.73		39.46	25.34	7.02			54.67	28.78	9.55

						anie A-o				
			SI	ATIONARY SI	OURCE EMIS FOR 1993 A	RCE EMISSIONS AT NAS FOR 1993 AND 1996-1999	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 1 FOR 1993 AND 1996-1999	=		
Source			1998	And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s				1999		1
Type	NOC.	NOx	သ	S02	PM10	VOC	NOX	63	802	PMIO
Stationary Sources:					The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon					
Boilers	0.62	27.13	89.9	22.82	3.38	0.62	27,13	89.9	22.82	3.38
										:
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
**************************************										
Engine Testing	9.70	54.02	67.01	1.81	9.72	11.95	60.64	74.65	1.99	12.03
									:	
IP-5 Fuel Handling	0.81	0.00	0.00	0.00	0.00	06:0	00'0	0.00	0.00	0.00
										:
Service Station	6.40	0.0	0.00	00.0	0.00	6.72	000	0.00	00.00	0.00
									***************************************	:
Painting	34.12	0.00	0.00	00.0	00.00	41.00	0.00	0.00	0.00	00:00
Construction:	00'0	00'0	0.00	0.00	0.00	2,55	26.13	8.18	2.41	4.08
								:		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Total	53.76	109.02	80.96	28.40	15.31	58 59	141 78	96 78	30 00	71 60

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen Key:

CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

				EMISSI	0	Table A-9 IN RATES FOR AIRCRAFT ENGINE TESTS AT NAS OCEANA - ARS (SINGLE ENGINE IN TEST CELLS)	Table A-9 I ENGINE TEST SINE IN TEST C	IS AT NAS OC ELLS)	EANA - ARS I	_		•		
Engine (Aircraft)	Power Setting	Time in Power Fue	Fuel Flow (Ib/min)	Calculated Fuel Usage (2)		Em (IIb)	Emission Factor (3)	3) ng)			Single E	Single Engine Test Emi (pounds)	issions	
	6	(minutes)		(gallons/test)	VOC (4)	l NOx	00	1 1	PM10	VOC (4)	NOx	, 03	203	PM10
F30-P-412A	Idle	28.00	15.33	63.12	31.42	3.22	55.51	0.54	8.96	13.49	1.38	23.83	0.23	3.85
(F-14A)	75%	5.00	71.67	52.70	1.48	10.74	3.43	!	7.98	0.53	3.85	1.23	. 0.19	2.86
	81%	23.00	77.40	261.79	120	16.02	1.62	1	7.98	2.14	28.52	2.88	96.0	14.21
•	A/B	22.00	796.67	2577.46	0.20	4.79	10.77		0.00	3.51	83.95	188.76	9.46	00'0
	Total	78.00		2955.08		¥ 300 000 000 000 000 000 000 000 000 00		į	Per Test	99'61	117.70	216.70	10.85	20.91
						\$ 100 m								
110-GE-400	Idle	54.00	19.50	154.85	3.97	2.74	15.75	0.54	12.38	4.18	2.89	16.58	0.57	13.04
(F-14B/D)	%18	44.00	143.70	929.82	0.26	19.61	0.76	0.54	2.81	1.64	123.99	4.81	3.41	17.77
	93%	25.00	198.22	728.75	0.31	28.53	1.08	0.54	2.81	1.54	141.38	5.35	2.68	13.92
	AB.	8.1	945.05	1528.76	3.75	12.64	44.21	0.54	0.00	38.98	131.40	459.59	5.61	00.0
•—	Total	134.00		3342.18	A 1137 C. 11 C. 13.				Per Test	46.34	399.66	486.33	12.27	44.73
:	1				方が動きな地でき									
J-52-P-8B	Ground Idle	-	11.33	53.32	48.96	1.79	63.78	0.54	0.00	17.75	0.65	23.12	0.20	00.0
(A-6)	RP		122.83	325.14	1.08	13.05	0.71	0.54	0.00	2.39	28.85	1.57	1.19	00.0
i	75% Thrust		72.00	254.12	0.87	10,10	3.00	0.54	00.0	1.50	17.45	5.18	0.93	00.0
	3k Lbs Thrust	_	38.33	140.92	1.99	6.34	10.54	0.54	00.0	161	80'9	10.10	0.52	00.0
:	Total	99.00		773.49					Per Test	23.55	\$3.03	39.98	2.84	0.00
		!												
F404-GE-400	Idle	52.00	10.40	79.53	58.18	1.16	137.34	0.40	12.38	31.46	0.63	74.27	0.22	6.70
(F/A-18)	80%	34.00	131.60	658.00	0.33	18.71	1.17	0.40	6.10	1.48	83,72	5.24	1.79	27.29
`	A/B	3.00	473.28	208.80	0.13	9.22	23.12	0.40	00:0	0.18	13.09	32.83	0.57	00.0
-	Total	00.00		046 33	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s				Dor Tost	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	17.00	113 24	157	33 00

Notes:

(1) Power setting and time in power setting provided by COMNAVAIRLANT.

(2) Assumes a product density of 6.8 lb/gallon for JP-5.

(3) Data for calculating model emission rates provided by the Navy Aircraft Environmental Support Office.

(4) Aircraft VOC reported as HC in the form CHy/x.

(5) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

A/B Max. = maximum afterburner IRP = intermediate rated power (same as military) 75% = 75% throttle setting VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:

E-81

EMISSIONS FROM AIRCRAFT ENGINE TESTING AT NAS OCEANA - ARS 1 FOR 1993 AND 1996-1999

						E ENGINE IN TEST	TEST CELLS)						
Year	Engine	Number of	Number of	VOC	(2)	NO	)¥		00	802	20	PN	PM10
	Model	Aircraft	Tests/Year	per test	Total	per test	Total	per test	Total	per test			
			0	(0)	(TPX)	(qp	CTPYO	(P)	(TPY)	( <b>IB</b> )	(TPY)	(B)	(TPV)
1993	TF30-P-412A	08	77	19.66	0.76	117.70	4.56	216.70	8.39	10.85	0.42	20.91	0.81
	F110-GE-400	55	99	46.34	1.52	399.66	13.12	486.33	15.97	12.27	0.40	44.73	1.47
	J-52-P-8B	98	83	23.55	0.98	53.03	2.21	39.98	1.66	2.84	0.12	0.00	00.00
				Total	3.26		19.89		26.03		0.94		2.28
9661	TF30-P-412A	93	8	19.66	68.0	117.70	5.30	216.70	9.76	10.85	0.49	20.91	0.94
	F110-GE-400	69	82	46.34	161	399.66	16.47	486.33	20.04	12.27	0.51	44.73	1.84
	F404-GE-400 (4)	12	0	33.12	0.00	97.43	0.00	112.34	00:00	2.57	00.0	33.99	0.00
	J-52-P-8B	14	4	23.55	0.16	53.03	0.36	39.98	0.27	2.84	0.02	0.00	00.0
	:			Total	2.95		22.13		30.07		1.01		2.78
	; ;		:										
1997	TF30-P-412A	95	92	19.66	06:0	01.711	5.41	216.70	9.97	10.85	0.50	20.91	96.0
	F110-GE-400	103	123	46.34	2.85	399.66	24.58	486.33	29.91	12.27	0.75	44.73	2.75
	F404-GE-400 (4)	12	0	33.12	0.00	97.43	000	112.34	00.00	2.57	00.0	00:00	00:0
				Total	3.75		29.99		39.88		1.25	:	3.71
											1		
8661	TF30-P-412A	20	09	99:61	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	132	298	33.12	4.94	97,43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
		:		Total	9.70		54.02		67.01		1.81		9.72
					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
1999	TF30-P-412A		09	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97		46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4 03
	F404-GE-400 (5)	192	434	33.12	7.19	97.43	21.14	112.34	24.38	2.57	0.56	33.99	7.38
		11 11 11		Total	11.95		60.64	:	74.65		1.99		12.03

(1) Number of engine tests per F-14B, F-14B,D, and F/A-18 aircraft from U.S. Navy (1997) and Wyle (1997). Number of A-6 engine tests per aircraft assumed to be the same as F-14A engine tests per aircraft.

(2) Aircraft engine emissions of VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(4) Adversary squadron engine tests not conducted at Oceana due to lack of F404 test equipment.

(5) Includes adversary squadron test cell events due to installation of F404 test equipment at NAS Oceana. Key:

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter



	Equipment	Days		Emission F	Factors (lb/1000 gal)	0 gal)			EMIS	EMISSIONS (lbs)		
Equipment List	quantity	Osed	NOX		00	802	PM10	NOx	VOC	ဝ	802	PM10
Crane	0	0	403	35.0	82.0	31.2	27	0.0	0.0	0.0	0.0	0.0
Backhoe Loader	2	09	395	39.0	133.0	31.2	27	2370.0	234.0	798.0	187.2	162.0
Pan Scraper	-	20	340	19.6	7.76	31.2	27	340.0	19.6	7.76	31.2	27.0
Hi-Lift	0	0	364	31.0	121.0	31.2	25	0.0	0'0	. 0.0	0.0	0.0
Front-end Loader, wheels	-	09	403	23.5	94.0	31.2	29	1209.0	70.5	282.0	93.6	87.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Track loader	-	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Grader	2	09	375	43.0	74.3	31.2	22	2250.0	. 258.0	445.8	187.2	132.0
Bulldozer	2	09	375	43.0	74.3	31.2	25	2250.0	258.0	445.8	187.2	150.0
Compactor	3	09	364	31.0	121.0	31.2	24	3276.0	279.0	1089.0	280.8	216.0
Roller	3	09	364	31.0	121.0	31.2	24	3276.0	279.0	1089.0	280.8	216.0
Paver	-	09	403	23.5	125.0	31.2	29	1209.0	70.5	375.0	93.6	87.0
				あるうと変								
Maul trk/cement mixer, mob(gm/	4	09	8.0	2.1	9.93	2.8	2.15	422.9	111.0	524.9	148.0	113.7
haul trk/cement mixer, idl(gm/hr	4	9	13.2	16.2	40.2	0	0	14.0	17.1	42.5	0.0	0.0
							Total, lb/yr	16616.9	1596.7	5189.7	1489.6	1190.7
							Total TPV		0.80	2.59	0.74	09.0

VOC = volatile organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
SO2 = sulfur dioxide
PM10 = particulate matter

NEW BOILDING/ADDITION CONSTRUCTION - ARS I Equipment Exhaust Emissions

	Equipment	Days		Emission F	Emission Factors (lb/1000 gal)	gal)			EMIS	EMISSIONS (Ibs)		
EQUIPMENT LIST	quantity	Used	NOX	XOC .	00	802	PM10	XON	voc	00	802	PM10
Crane	3	120	403	35.0	82.0	31.2	27	7254.0	630.0	1476.0	561.6	486.0
Backhoe Loader	2	120	395	39.0	133.0	31.2	27	4740.0	468.0	1596.0	374.4	3240
Pan Scraper	-	120	340	9.61	7.76	31.2	27	2040.0	117.6	586.2	187.2	16.0
Hi-Lift	4	120	364	31.0	121.0	31.2	25	8736.0	744.0	2904.0	748.8	6009
Front-end Loader, wheels	-	120	403	23.5	94.0	31.2	29	2418.0	141.0	564.0	187.2	174.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	00	2 0
Track loader	0	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	00	0.0
Grader	-	120	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	132.0
Bulldozer	2	120	375	43.0	74.3	31.2	25	4500.0	\$16.0	891.6	374.4	3000
Compactor	-;	120	364	31.0	121.0	31.2	24	2184.0	186.0	726.0	187.2	144 0
Roller	0	0	364	31.0	121.0	31.2	24	0.0	0.0	0.0	0.0	00
Paver	0	0	403	23.5	125.0	31.2	29	0.0	0.0	0.0	0.0	00
										:	-	-
haul trk, mob(gm/mi)	7	120	8.0	2.1	9.93	2.8	2.15	1480.2	388.5	1837.3	518.1	397.8
haul trk, idl(gm/hr)	7	120	13.2	16.2	40.2	0	0	48.8	59.9	148.8	0.0	0.0
							Total Lb/yr	35651.0	3509.1	11175.6	3326.1	2719.8
							Total TPV	17.81	1.74	6 20	1 66	1 36

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

# Table A-12 ANNUAL DEMOLITION PARTICULATE EMISSIONS - ARS 1

EMISSIONS	ТРҮ	1.14
	LBS/YR	2281.8
STRUCTURE DEBRIS VEHICLE	(SQ FT) REMOVAL (LBS) REMOVAL (LBS) ACTIVITY (LBS) LBS/YR	199,381 10.0 184.3 2087.5 2281.8 1.14
DEBRIS	REMOVAL (LBS) A	184.3
	REMOVAL (LBS)	10.0
Floor Space	(SQ FT)	199,381

# Notes:

Demolition square ft assumed = 10 % of new construction sq ft PM emission from structure takedown based on sq ft \*EF PM emission from debris removal based on sq ft \*EF PM emission from on-site vehicle activity based on sq ft \*EF Pushing (bulldozing) PM emission put under site prep spreadsheet Reference EPA-450/2-92-004 (Fugitive Dust document) (all EF's in EPA document converted to english units)

	SANA - ARS	EMISSIONS	TPY	0.95
	AT NAS OCI	EMISSION	LBS/YR	1894
Table A-12	ANNUAL SITE PREPARATION PARTICULATE EMISSIONS FOR CONSTRUCTION AT NAS OCEANA - ARS	RAPING PAN SCRAPING	(LBS) SOIL REMOV(LBS) ETHMOVING (LBS) LBS/YR	454
i	LATE EMISSIONS F	PAN SC	SOIL REMOV(LBS)	720
	ION PARTICU	CTIVITY BULLDOZIN	(LBS)	720
	E PREPARAT	ACTIVITY	DAYS	120
	ANNUAL SIT	ACRES		46

Notes:

Acreage estimate based on building sq ft\*2
Estimate activity days for preferred, develop ratio days:acres
Apply ratio to ARS acreages to get activity days
Bulldozing pm emissions based on 8hr/activity day \* EF (EPA 1992)
Soil removal emiss based on VMT/acre \*acres\*EF (EPA 1992)
Earthmoving emiss based on soil removal miles \*3 (BEE)\*EF
EPA 1992 is Fugitive Dust BG document (EPA-450/2-92-004)

	Table A-13			
Total Co	Total Construction Emissions (Exhaust and Dust) - ARS	Dust) - ARS		
Project/Source	Emis	Emissions (tons/yr)	'r)	
Engine Exhaust Emissions	VOC	93	SOx	PM10
Parking Lot Construction	0.80 8:31	2.59	0.74	09.0
Building/Addition Const. (total)	1.75	5.59	1.66	1.36
Demolition/Construction Activity		TO THE R P. LEWIS CO., IN CO., IN CO., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC., INC		
Mechanical dust Generation	0.00	0.00	0.00	2.12
Total	2,55	8.18	2.41	4.08

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads Maintenance Plan Key:

VOC = volatile organic compounds

NOx = oxides of nitrogen

CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

				<u>a</u>	EMISSIONS	SUMMA	RY - NAS FOR 19	' - NAS OCEANA AND N/ FOR 1993 AND 1996-1999	AND NA]	LF FENT	ONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS FOR 1003 AND 1996-1990	tS 1			
		# # 1					(t	(tons per year)	ır)						
			1993					1996					1997		
Source Type	VOCs	NOx	00	<b>S02</b>	PM10	VOCs	NOx	9	S02	PM10	VOCs	NOX	2	802	PM10
NAS Oceana:															
Mobile Sources:															
Aircraft Operations	500.57	353.51	1,018.55	23.55	223.43	264.30	243.77	571.94	14.56	179.73	244.44	298.79	565.66	16.59	224.11
Total Aircraft	500.57	353.51	1,018.55	23.55	223.43	264.30	243.77	571.94	14.56	179.73	244.44	298.79	565.66	16.59	224.11
Other Mobile Sources:															:
GSE	5.13	26.43	72.65	1.71	2.00	3.09	27.35	17.03	1.84	2.24	4.57	34.01	18.73	2.20	2.66
Maintenance Run-ups	71.97	71.97   165.99	131.90	5.65	46.27	30.13	131.19	65.36	3.91	48.77	31.59	197.60	85.86	5.51	66.41
Generators	0.56	68.9	1.48	0.45	0.48	0.56	68:9	1.48	0.45	0.48	0.56	6.89	1.48	0.45	0.48
Total Other Mobile	77.65	199.30	206.03	7.81	48.75	33.78	165.43	83.87	6.20	51.50	36.72	238.49	106.07	8.17	69.56
Stationary Sources:													:		:
Boilers:	1:13	32.32	8.31	22.09	3.84	0.78	29.13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	3.63
Generators	0.71	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3.77	2.21
<u> </u>															
Engine Test Cells	3.26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	3.71
JP-5 Fuel Handling	99.0	00.0	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
							*/								
Service Station	19.35	0.00	0.00	0.00	0.00	4.46	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00
:				:					1	:					
Painting	19.30	0.00	0.00	0.00	0.00	13.29	0.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00
										:					
Construction:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Stationary	44,41	60.88	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
Total NASO	622.64	613.70	613.70 1,260.78	54.97	278.91	320.73	469.13	695.27	46.10	238.25	307.01	624.28	726.40	53.55	303.22
NALF Fentress:															
Aircraft	13.48	146.63	37.00	6.81	30.87	7,20	145.45	19.20	6.03	39.01	7.73	175.88	19.05	6.88	47.82
Total Ammol.	OI 100 - 77 5/1	20074	1	40 77	000		P. C. C. L. B. T				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ŀ			



					Table A-14	A-14				
		<b>EMISS</b>	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 1	MARY -	NAS OCE	ANA AND	NALF FE	NTRESS -	ARS 1	
				S.	FOR 1993 AND 1996-1999 (tons ner vear)	ID 1996-15 r vear)	666			
			1998					1999		
Source Type	VOCs	NOX	00	S02	PM10	Vocs	NOX	00	S02	PM10
NAS Oceana:										
Mobile Sources:										
Aircraft Operations	440.58	438.91	1,129.73	21.79	310.54	563.10	513.16	1,457.49	25.04	359.56
Total Aircraft	440.58	438.91	438.91 1,129.73	21.79	310.54	\$63.10	513.16 1,457.49	1,457.49	25.04	359.56
Other Mobile Sources:										
GSE	3.67	34.57	17.17	2.32	2.79	3.69	34.66	17.22	1.73	1.92
Maintenance Run-ups	35.21	189.46	101.61	3.63	61.07	43.23	203.74	123.04	5.44	62.39
Generators	0.56	6839	1.48	0.45	0.48	0.56	6.89	1.48	0.45	0.48
Total Other Mobile	39.44	230.91	120.25	6.40	64.34	47.48	245.29	141.74	7.62	66.79
Stationary Sources:										
Boilers:	0.62	27,13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	9.70	54.02	67.01	181	9.72	11.95	60.64	74.65	1.99	12.03
										:
JP-5 Fuel Handling	0.81	0.00	00.00	0.00	0.00	06:0	0.00	0.00	0.00	0.00
					-					
Service Station	6.40	0.00	0.00	0.00	0.00	6.72	000	0.00	0.00	0.00
		X	000	90				9	90	0
Painting	34.12	0.00	0.00	0.00	0.00	41.00	30.5	0.00	30.0	3
Construction:	0.00	000	0.00	0.00	0.00	2.55	26.13	8.18	2.41	4.08
Total Stationary	53.76	109.02	80.96	28.40	15.31	65.85	141.78	96.78	30.99	21.69
Total NASO	533.78	778.85	1,330.95	26.60	390.18	676.43	900.23	1,696.02	63.65	451.05
NALF Fentress:									:	:
Aircraft	8.50	225.66	23.90	8.36	67.22	9.35		27.23	9.19	78.26
Total Annual.	K42.28	542.28 1.004.51 1.354.85	1 354 85	64.97	457.40	685.78	1,151,30 1,723.25	1.723.25	72.84	529.30

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

SO2 = sulfur dioxide. Key: VOC = volatile organic compounds. NOx = oxides of nitrogen. CO = carbon monoxide.

JP-5 = jet fuel.PM10 = particulate matter. JP-5 GSE = Ground Support Equipment

Table A-15 NET EMISSIONS CHANGE - NAS OCEANA AND NALF FENTRESS - ARS	S CHANGE - 1	Table A-15 VAS OCEANA A	ND NALF FE	NTRESS - ARS	-
		(tons per year)	 		<b>1</b>
Year	VOCs	NOX	00	S02·	PM10
NAS Oceana:					
1993	622.64	613.70	1260.78	54.97	278.91
9661	320.73	469.13	695.27	46.10	238.25
1997	307.01	624.28	726.40	53.55	303.22
1998	533.78	778.85	1330.95	56.60	390.18
6661	676.43	900.23	1696.02	63.65	451.05
Net Change:					
1993 to 1999	53.79	286.53	435.23	8.68	172.14
NALF Fentress:				1	
1993	13.48	146.63	37.00	6.81	30.87
1996	7.20	145.45	19.20	6.03	39.01
1997	7.73	175.88	19.05	6.88	47.82
8661	8.50	225.66	23.90	8.36	67.22
6661	9.35	251.06	27.23	9.19	78.26
Net Change:					:
1993 to 1999	-4:13	104.43	-9.77	2.39	47.39
Net Change NAS Oceana and NALF Fentress:					
1993 to 1999	49.66	390.96	425.47	11 06	210 52

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

02/17/98 T5 AM

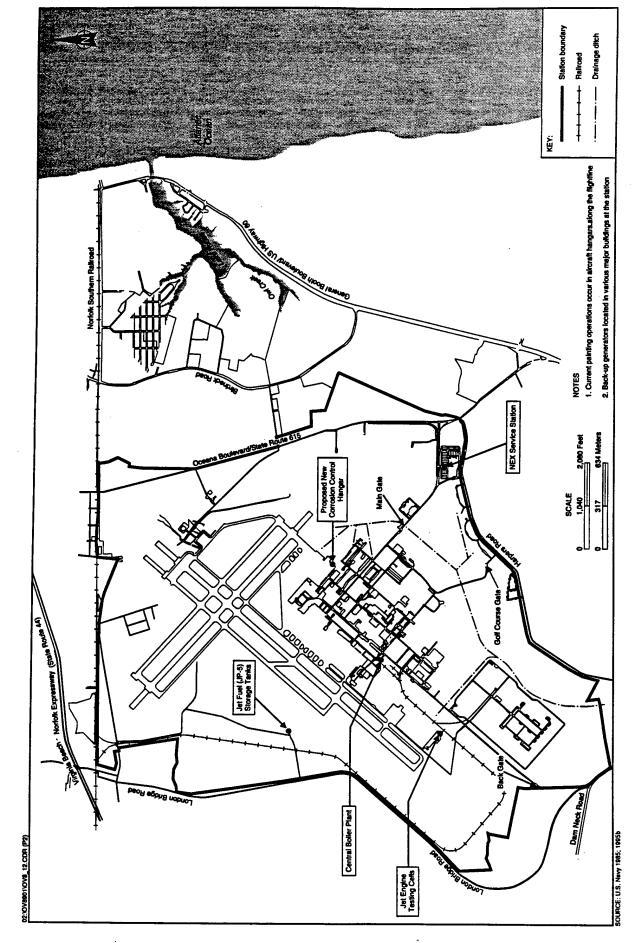


Figure A-1 EXISTING AND PROPOSED STATIONARY AIR EMISSION SOURCES

B Airfield and Airspace Operational Study for the 1995 BRAC Realignment of Navy F/A-18 Aircraft Excerpted from Airfield and Airspace Operational Study Report for the 1995 BRAC Realignment of Navy F/A-18 Aircraft, ATAC Corporation, 1998.

# AIRFIELD UTILIZATION

This section contains tables of airfield operations, flight track operations, and NAS Oceana Lightship approach data for selected scenarios. MCAS Cherry Point and MCALF Bogue Field airfield operation tables are not included for ARS-1, -2, and -4. The operation levels and type distributions of these scenarios do not differ significantly from the scenarios with the same base loading at MCAS Cherry Point. To determine the MCAS Cherry Point and MCALF Bogue Field airfield operations for ARS-1, -2, and -4, see the Baseline tables.

In reviewing and comparing quantitative results, note that, unless otherwise discussed in the text (Section 3), each of the alternatives should be compared against the baseline scenario. Since the results are dependent upon airwing compositions as well as base loading, comparisons between the alternative scenarios may result in misleading conclusions. Some variation is to be expected due to random behavior designed into the model.

# **Basic Airfield Operations**

Two types of airfield operations tables are presented: basic and flight track. The basic airfield operations are those commonly used by ATC personnel in counting the number of actions during each airfield event. They are defined as follows:

Departure	One aircraft taking off from a runway from a full stop. <i>One operation</i> .
Full Stop Visual Landing	One aircraft performing a full-stop landing under VFR from either the visual touch-and-go pattern, or a straight-in approach. <i>One operation</i> .
Full Stop Instrument Landing	One aircraft performing a full-stop landing using a GCA or other instrument landing system. One operation.
Pad Landing	One aircraft performing an approach to a vertical landing on a pad. <i>One operation</i> .
Visual Touch-and-Go/ Low Approach	One aircraft performing a visual approach followed by either a takeoff (in a touch-and-go) or a missed approach. <i>Two operations</i> .
Instrument Touch-and-Go/ Low Approach	One aircraft performing an instrument approach followed by either a takeoff (in a touch-and-go) or a missed approach. <i>Two operations</i> .
Field Carrier Landing Practice	Similar to a visual touch-and go event. Two operations.



A-1

Press-Up A vertical takeoff:

A vertical takeoff from a pad followed by hovering

maneuvers and a vertical pad landing. Two

operations.

Pad Vertical Takeoff

to Pad Landing

Circuit

One aircraft performs a vertical takeoff from a pad, accelerates to forward flight speed around a pattern, and conducts an approach to a vertical pad landing.

Two operations.

Specific operations at MCALF Bogue Field include:

Field Carrier Landing

Practice

Pattern operations with approaches to a simulated

ship deck. Two operations.

Forward Base Operations

Pattern operations with approaches to the runway.

Two operations.

Expeditionary Airfield

Operations

Arrivals, departures, and pattern operations during expeditionary airfield demonstrations and exercises.

Transient aircraft airfield operations are performed by aircraft not based at the specific air station. The transient aircraft may perform a full-stop landing and remain at the base for several hours or several days. Some transients conduct approaches and depart out of the local operating area. The sources of these transient aircraft are as diverse as the number of military bases throughout the United States, but certain aircraft types perform the majority of operations in each transient group. The transient aircraft groups are described below:

#### **NAS Oceana**

Transient Jet

Primarily Navy jets such as F-14, S-3, and F/A-18

aircraft, but includes Lear jets and transports.

Transient Prop

Primarily E-2, C-2, T-34, and C-130 aircraft.

# **MCAS Cherry Point**

Transient Jet

Includes a wide variety of military jets such as F-15,

F-16, and F/A-18 aircraft.

**Transient Prop** 

Includes C-12, E-2, and C-130 aircraft.

Transient Heavy

Primarily C-141, C-5, and KC-10, aircraft.

Transient Large

Primarily C-9 aircraft.

Transient Helicopter

Includes H-46, H-53, UH-1, AH-1, AH-64, and

OH-58 helicopters.

# MCALF Bogue Field

Marine Corps Helicopter

Primarily MCAS New River-based CH-46, CH-53,

UH-1, and AH-1 helicopters.



# Annual Basic Operations at NAS Oceana and NALF Fentress for ARS-1

				Irfield Operations	
Aircraft	Operation Type		Day	Night	Total
Category			0700-2200	2200-0700	
F-14 Fleet	Departure		12,181	1,169	13,350
	Full Stop Visual Landing		11,302	1,502	12,804
	Full Stop Instrument Landing		365	171	536
	Visual Touch-and-Go/Low Approach		20,772	994	21,766
	Instrument Touch-and-Go/Low Approach	1	456	56	512
	Field Carrier Landing Practice	•	640	240	880
		TOTAL	45,716	4,132	49,848
F-14 FRS	Departure		6,539	425	6,964
	Full Stop Visual Landing		5,921	393	6,314
	Full Stop Instrument Landing		<b>26</b> 5	385	650
	Visual Touch-and-Go/Low Approach		25,274	918	26,192
	Instrument Touch-and-Go/Low Approach		3,732	1,500	5,232
	Field Carrier Landing Practice		o	180	180
		TOTAL	41,731	3.801	45,532
F/A-18 Fleet	Departure		14,330	1,298	15,628
.,	Full Stop Visual Landing		12,556	1,891	14,447
	Full Stop Instrument Landing		851	342	1.193
	Visual Touch-and-Go/Low Approach		24,342	1,914	26,256
•	Instrument Touch-and-Go/Low Approach		2,124	800	2,924
	Field Carrier Landing Practice	į	1,180	1,080	2,260
	Fleid Carrier Carloing Fractice	TOTAL	55,383	7,325	62,708
F/A-18 FRS	Departure	TOTAL	8.059	479	8.538
r/A-10 rn3	Full Stop Visual Landing		6,838	667	7,505
	Full Stop Instrument Landing		689	344	1,033
	Visual Touch-and-Go/Low Approach	ŀ	35,822	2,412	38,234
	Instrument Touch-and-Go/Low Approach		4,406	654	5,060
	1		160	0	160
	Field Carrier Landing Practice	TOTAL		4,556	60.530
Ad-mana.	Deserting	TOTAL	55,974 2,262	4,556	2,333
Adversary	Departure		2,262	<b>7</b>	2,333 2,316
	Full Stop Visual Landing		_,		2,310
	Full Stop Instrument Landing		16	1 0	1,476
	Visual Touch-and-Go/Low Approach		1,476	0	1,476
	Instrument Touch-and-Go/Low Approach	7074	166		
Tananiant lat		TOTAL	6,236	72	6,308
Transient Jet	Departure	[	947	20	967
	Full Stop Visual Landing		709	14	723
	Full Stop Instrument Landing		242	2	244
	Visual Touch-and-Go/Low Approach		1,004	22	1,026
	Instrument Touch-and-Go/Low Approach		804	30	834
		TOTAL	3,706	88	3,794
Transient Prop	Departure		1,634	30	1,664
	Full Stop Visual Landing		1,173	16	1,189
	Full Stop Instrument Landing		467	8	475
	Visual Touch-and-Go/Low Approach		2,778	52	2,830
	Instrument Touch-and-Go/Low Approach		2,572	42	2,614
		TOTAL	8,624	148	8,772
		AIRFIELD TOTAL	217,370	20,122	237,492

#### NALF Fentress

		A	Airfield Operations		
Aircraft	Operation Type	Day	Night	Total	
Category		0700-2200	2200-0700		
F-14 Fleet	Field Carrier Landing Practice	20,508	17,652	38,160	
F-14 FRS	Field Carrier Landing Practice	14,802	8,658	23,460	
F/A-18 Fleet	Field Carrier Landing Practice	17,629	11,711	29,340	
F/A-18 FRS	Field Carrier Landing Practice	17,187	7,299	24,486	
E-2 Fleet	Field Carrier Landing Practice	7,873	8,927	16,800	
E-2 FRS	Field Carrier Landing Practice	10,291	7,309	17,600	
C-2 Fleet	Field Carrier Landing Practice	7,860	488	8,348	
	AIRFIELD 1	TOTAL 96,150	62,044	158,194	



# Flight Track Airfield Operations

Flight track airfield operations are those commonly used to assess the frequency by which specific flight tracks are used and are provided to support noise assessment efforts. For NAS Oceana and NALF Fentress, they are defined as follows:

#### NAS Oceana

One aircraft leaving the airfield traffic pattern to the Southeasterly Departure

southeast (e.g., APOLLO Departure). One

operation.

Northeasterly Departure One aircraft leaving the airfield traffic pattern to the

northeast (e.g., SOUCEK/NORFOLK Departure).

One operation.

Interfacility Departure

to Fentress

One aircraft leaving the NAS Oceana airfield and arriving at NALF Fentress. One operation.

Straight-In/Full Stop

Arrival

One aircraft approaching the NAS Oceana directly to a runway (including instrument and visual

straight-in approaches) to either a full-stop landing, touch-and-go, or low approach (excluding arrivals

from NALF Fentress). One operation.

Overhead Arrival at

Oceana

One aircraft arriving at the airfield through the overhead approach (excluding arrivals from NALF

Fentress). One operation.

Visual Touch-and-Go

One full circuit of the visual (tower) pattern. Two

operations.

GCA Pattern

One full circuit of the GCA box pattern. Two

operations.

Depart and Reenter

to Overhead

One aircraft conducting an overhead approach immediately after leaving the airfield traffic pattern.

One operation.

FCLP Pattern

One full circuit of the FCLP pattern at NAS Oceana.

Two operations.

Interfacility Arrival from

Fentress (w/ overhead

approach)

One aircraft leaving NALF Fentress and arriving at NAS Oceana via the overhead approach. One

operation.

Interfacility Arrival from

approach)

One aircraft leaving NALF Fentress and conducting

Fentress (w/ straight-in a straight-in approach at NAS Oceana. One

operation.



E-100 A-13

#### **NALF** Fentress

Interfacility Arrival from

Oceana(w/ overhead

One aircraft leaving NAS Oceana and arriving at

NALF Fentress via the overhead approach.

approach)

FCLP Pattern One full cir

One full circuit of the FCLP pattern at NALF

Fentress. Two operations.

Interfacility Departure

to Oceana

One aircraft leaving the NALF Fentress airfield and

arriving at NAS Oceana. One operation.

For MCAS Cherry Point and MCALF Bogue Field, the flight track descriptions are as follows:

One operation.

# **MCAS Cherry Point**

Departure One aircraft leaving the airfield traffic pattern. One

operation.

Interfacility Departure to

Bogue Field

One aircraft leaving the MCAS Cherry Point airfield

and arriving at MCALF Bogue Field. One

operation.

Straight-In/Full Stop

Arrival

One aircraft approaching MCAS Cherry Point

directly to a runway (including instrument and visual straight-in approaches) to either a full-stop landing, touch-and-go, or low approach (excluding arrivals

from MCALF Bogue Field). One operation.

Overhead Arrival at

Cherry Point to Runway

One aircraft arriving at the airfield through the overhead approach to a runway (excluding arrivals from MCALF Bogue Field). *One operation*.

Overhead Arrival at

Cherry Point to Pad

One AV-8 aircraft arriving at the airfield through the overhead approach to a pad (excluding arrivals from

MCALF Bogue Field). One operation.

Visual Touch-and-Go One full circuit of the visual (tower) pattern. Two

operations.

FCLP Pattern One full circuit of the FCLP pattern at MCAS

Cherry Point. Two operations.

Full Circuit to Runway One AV-8 aircraft entering the tower pattern for an

arrival to a runway immediately after departing. Two

operations.

Full Circuit to Pad One AV-8 aircraft entering the tower pattern for an

arrival to a pad immediately after departing. Two

operations.



GCA Pattern One full circuit of the GCA box pattern. Two

operations.

Depart and Reenter

to Overhead

One aircraft conducting an overhead approach immediately after leaving the airfield traffic pattern.

One operation.

Press-Up A vertical takeoff from a pad followed by hovering

maneuvers and a vertical pad landing. Two

operations.

Pad Vertical Takeoff to

Pad Landing Circuit

One aircraft performs a vertical takeoff from a pad, accelerates to forward flight speed around a pattern, and conducts an approach to a vertical pad landing.

Two operations.

Interfacility Arrival from

Bogue Field (w/ overhead approach) One aircraft leaving MCALF Bogue Field and arriving at MCAS Cherry Point via the overhead

approach. One operation.

Interfacility Arrival from

Bogue Field (w/ straight-in approach) One aircraft leaving MCALF Bogue Field and conducting a straight-in approach at MCAS Cherry

Point. One operation.

# MCALF Bogue Field

Interfacility Arrival from

**Cherry Point** 

One aircraft leaving MCAS Cherry Point and arriving at MCALF Bogue Field. One operation.

Arrival

One aircraft arriving at MCALF Bogue Field

(excluding arrivals from MCAS Cherry Point). One

operation.

**FCLP Pattern** 

One full circuit of the FCLP pattern at MCALF

Bogue Field. Two operations.

Forward Base Operations

Pattern

One full circuit of the FBO pattern at MCALF

Bogue Field. Two operations.

Interfacility Departure

to Cherry Point

One aircraft leaving MCALF Bogue Field and arriving at MCAS Cherry Point. One operation.



# Annual Flight Track Operations at NAS Oceana for ARS-1

				Irfield Operations	Total
Aircraft	Operation Type		Day 0700-2200	Night 2200-0700	Total
Category F-14 Fleet	Southeasterly Departure		4,798	60	4,858
r-14 rieet	Northeasterly Departure		5.953	99	6,05
	Interfacility Departure to Fentress		1,390	995	2,38
	Interfacility Arrival from Fentress (w/ overhead approach)		1,130	1.045	2,17
	•		70	140	21
	Interfacility Arrival from Fentress (w/ straight-in approach)			41	50:
	Straight-In/Full stop Arrival (non-interfacility)		464		
	Overhead Arrival at Oceana (non-interfacility)		10,015	380	10,39
	Depart and Reenter to Overhead		108	0	10
	Visual Touch-and-Go	- 1	20,908	1,076	21,98
	GCA Box		240	56	29
	FCLP Pattern		640	240	880
		TOTAL	45,716	4,132	49,848
F-14 FRS	Southeasterly Departure		1,593	0	1,590
	Northeasterly Departure	1	4,041	o	4,04
	Interfacility Departure to Fentress	1	880	415	1,29
	Interfacility Arrival from Fentress (w/ overhead approach)	1	485	190	675
	1	1	290	330	620
	Interfacility Arrival from Fentress (w/ straight-in approach)	1		132	1,806
	Straight-In/Full stop Arrival (non-interfacility)	İ	1,674		· · ·
	Overhead Arrival at Oceana (non-interfacility)	1	3,740	88	3,828
	Depart and Reenter to Overhead		692	0	692
	Visual Touch-and-Go	İ	26,158	1,100	27,258
	GCA Box		2,178	1,366	3,544
	FCLP Pattern		0	180	180
		TOTAL	41,731	3,801	45,532
F/A-18 Fleet	Southeasterly Departure		6,211	232	6,443
	Northeasterly Departure		6,729	96	6,825
	Interfacility Departure to Fentress		1,305	880	2,185
	Interfacility Arrival from Fentress (w/ overhead approach)	ŀ	1,065	933	1,998
	Interfacility Arrival from Fentress (w/ straight-in approach)		80	107	187
	Straight-In/Full stop Arrival (non-interfacility)	1	1,693	617	2,310
	Overhead Arrival at Oceana (non-interfacility)		10,546	424	10,970
	Depart and Reenter to Overhead	i	326	0	326
		- 1	25.840	2,884	28,724
	Visual Touch-and-Go			-	480
	GCA Box	ŀ	408	72	
	FCLP Pattern		1,180	1,080	2,260
		TOTAL	55,383	7,325	62,708
F/A-18 FRS	Southeasterly Departure		385	0	385
	Northeasterly Departure	į	6,542	84	6,626
	Interfacility Departure to Fentress	ŀ	1,122	<b>39</b> 5	1,517
	Interfacility Arrival from Fentress (w/ overhead approach)	ļ	672	193	865
	Interfacility Arrival from Fentress (w/ straight-in approach)		345	307	652
	Straight-In/Full stop Arrival (non-interfacility)		1,977	280	2,257
	Overhead Arrival at Oceana (non-interfacility)		4,560	194	4,754
	Depart and Reenter to Overhead	ļ	1,165	181	1,346
	Visual Touch-and-Go		37,548	2,704	40,252
	GCA Box		1,498	218	1,716
	FCLP Pattern		160	0	160
	TOLI TULION	TOTAL	55,974	4,556	60,530
Adversary	Southeastedy Departure	TOTAL		71	1,786
-wei say	Southeasterly Departure	1	1,715		
	Northeasterly Departure	-	547	0	547
	Straight-In/Full stop Arrival (non-interfacility)	1	116	1	117
	Overhead Arrival at Oceana (non-interfacility)		2,216	0	2,216
	Visual Touch-and-Go		1,642	0	1,642
		TOTAL	6,236	72	6,308
Transient Jet	Southeasterly Departure	T	46	2	48
	Northeasterly Departure		901	18	919
	Straight-In/Full stop Arrival (non-interfacility)		285	8	293
	Overhead Arrival at Oceana (non-interfacility)		668	6	674
	Visual Touch-and-Go		1,084	32	1,116
	IGCA Box		722	22	744
		TOTAL	3,706	88	3,794
Fransient Prop	Southeasterly Departure	TOTAL	174	3	3,79
i i a i sietit Frop			1		
	Northeasterly Departure		1,460	27	1,48
	Straight-In/Full stop Arrival (non-interfacility)		670	12	68:
	Overhead Arrival at Oceana (non-interfacility)	ļ	973	9	98
	Visual Touch-and-Go	į	3,171	61	3,23
	GCA Box	j	2,176	36	2,21
		TOTAL			
		IUIALI	8,624	148	8,772

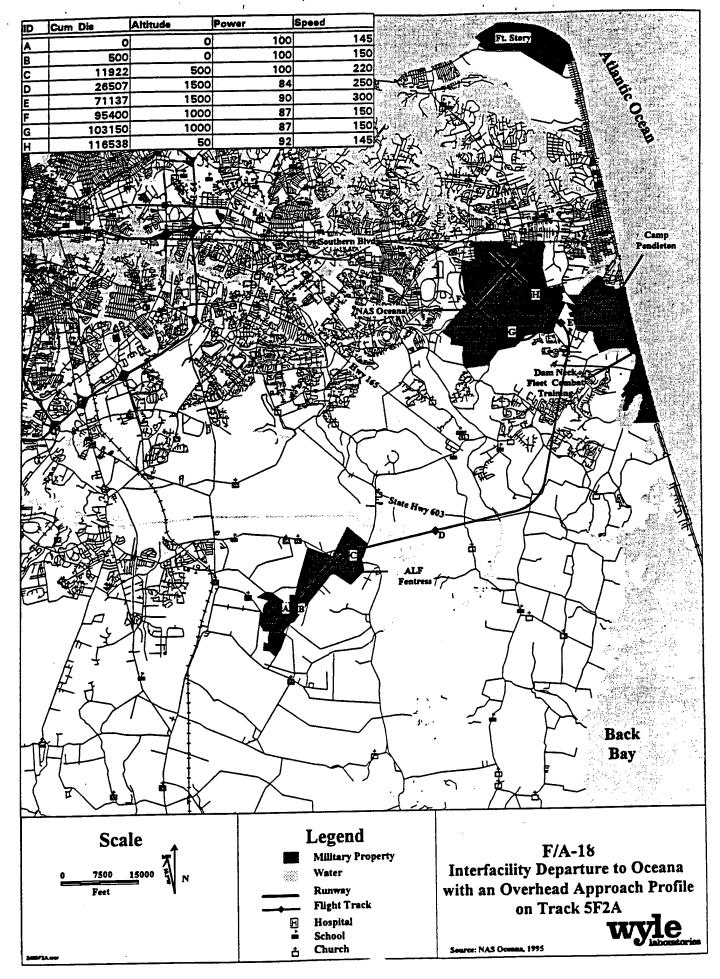


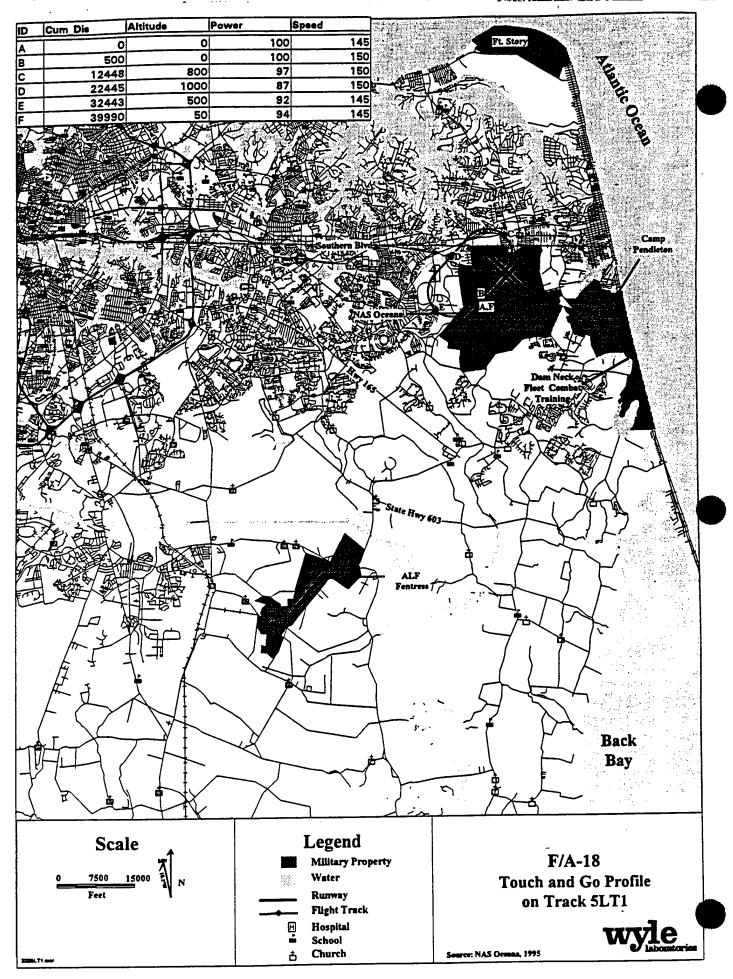
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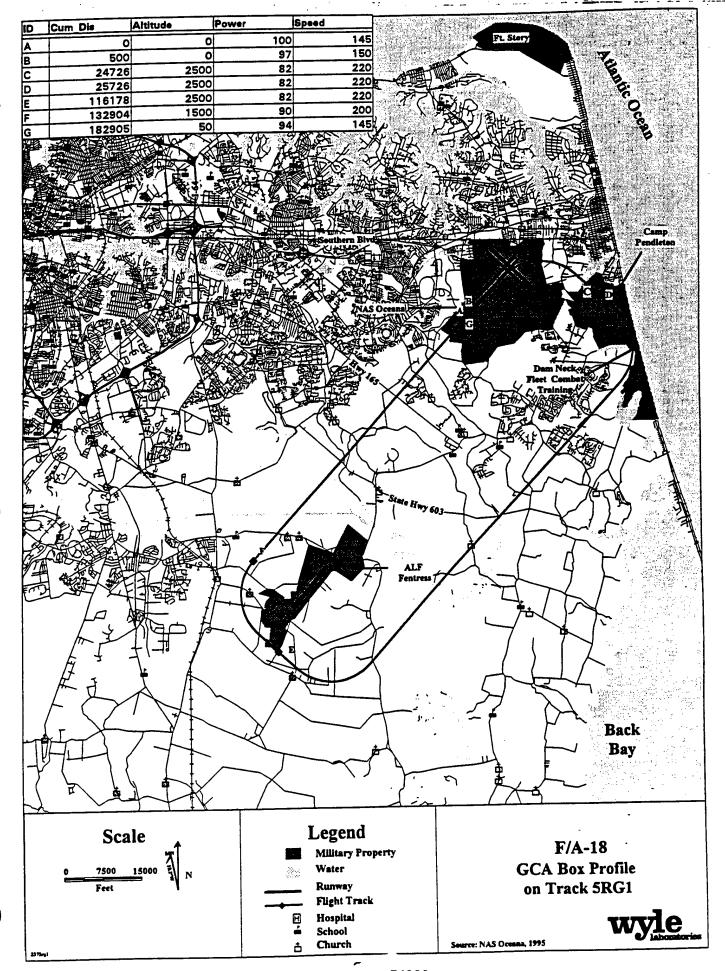
# **NAS Oceana Flight Tracks**

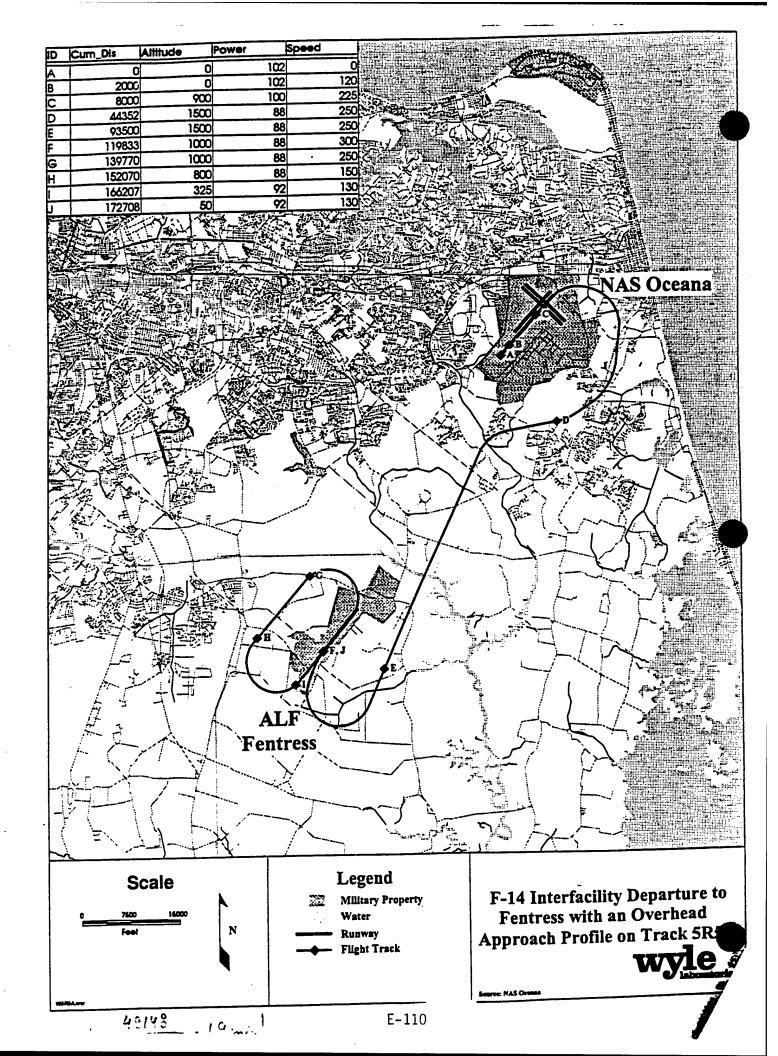
Derived from Aircraft Noise Study for Naval Air Station Oceana and Auxiliary

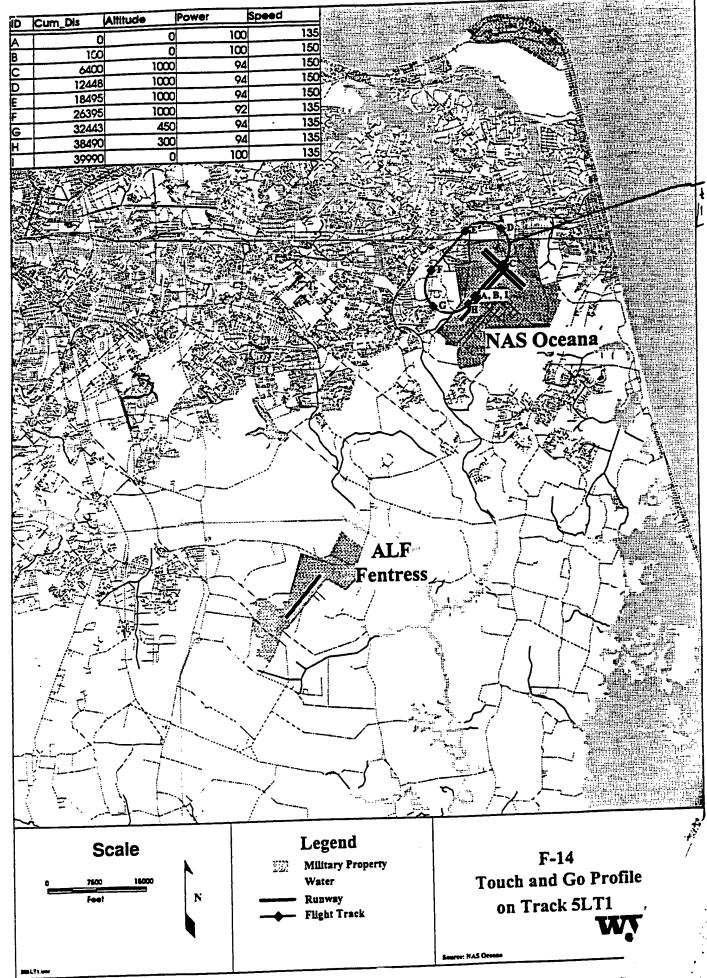
Landing Field Fentress, Virginia, and Related Airspaces, Draft, 1997 by Wyle Laboratories.

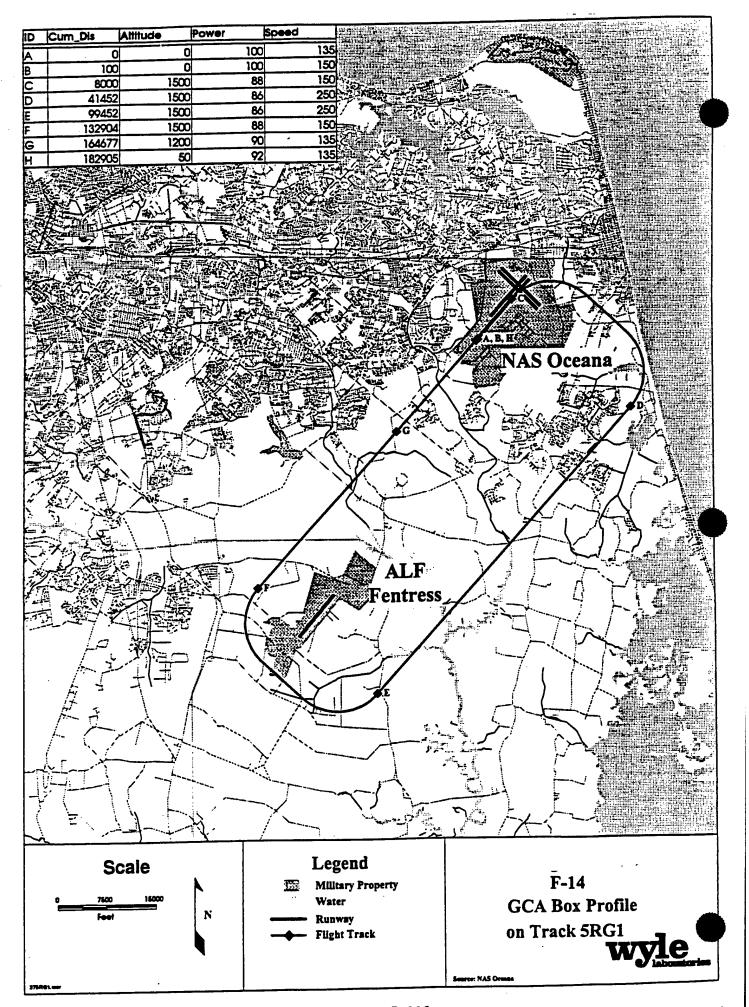


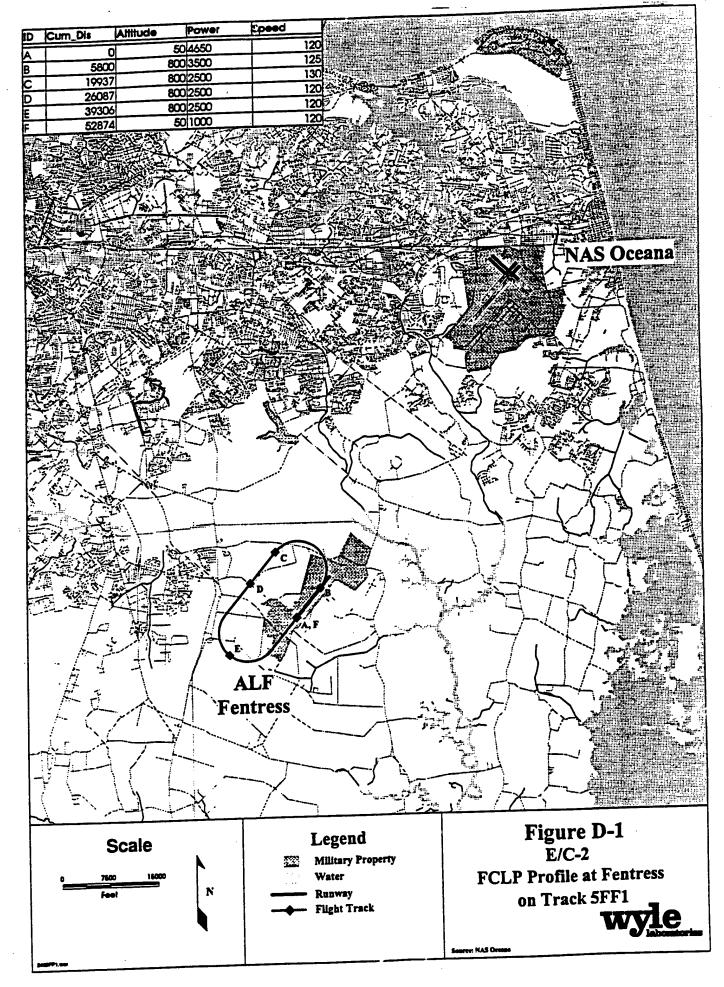












D Transportation	Conformity	Memorandum
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### **⇒** ICF KAISER

CONSULTING GROUP

ICF Idoorporated 8300 Lee Highway Fairfax. VA 22031-1207 703/934-8000 Fax 703-934-9740

June 7, 1995

### MEMORANDUM

TO:

Ahmet Anday, VDOT

FROM:

Marsha Kaiser.

SUBJECT:

Impact of BRAC on Transportation Conformity

This is ip response to your request for a review of the impacts on the transportation conformity determinations for the TIP and RTP for the Hampton Roads nonattainment area as a result of the BRAC 95 recommended realignment of the FA-14 and FA-18 squadrons from other locations to the NAS Oceans in Virginia Beach.

The BRAC 95 recommendations include provisions for redirecting F-14 and F-18 squadrons from other locations to NAS Oceans over the years 1997-1998. The BRAC 95 recommendations, if approved would ultimately result in an employment population of 12,390 at Ocean in the year 2015. While this would exceed the original population forecast in the Hampton Roads 2015 Economic Forecast of 10,850 by 1,540, it exceeds the 1990 baseline population in the Forecast by only 60. This is important to note since the 1990 population figures were used in developing the transportation conformity baseline data for determination analysis.

Although the population at NAS Oceans is now projected to increase rather than decrease relative to the baseline level, this increase is highly insignificant (less than 1 percent). Thus, the BRAC 95 recommendation essentially represents a realignment of existing trips along the Hampton Rhads transportation network. It will have no significant impact on VMT nor vehicle emissions overall in the region and, therefore, will have no impacts on the results of the recently completed transportation conformity determinations for the Hampton Roads nonattainment area.

F

## Air Conformity Analyses for ARSs 2, 3, 4, and 5

The following tables present air quality calculations for ARSs 2, 3, 4, and 5. These same calculations are presented for ARS 1 in Appendix E (Air Conformity Determination). The primary differences among the ARSs with regard to these calculations are the total number of aircraft operations under each ARS, the number of in-aircraft engine maintenance run-ups and the number of engine tests in test cells.

Table F-1
ARS 2
TOTAL AIRCRAFT OPERATIONS AT NAS OCEANA AND NALF FENTRESS
FOR 1993 AND 1996-1999

Aircraft Type	Operation type	1993	1996	1997	1998	1999
F-14A	Full LTO	12,465	9,621	9,828	6,869	6.869
	Touch&Go NASO	15,236	12,331	12,596	10,274	10.274
	GCA Box	2,178	1,048	1,071	1,010	1,010
	Interfacility	2,164	1,768	1,806	1,253	1,253
	Touch&Go NALF	10,511	13,124	13,406	9,519	9.519
F-14B/D	Full LTO	8,551	6,913	10,319	10,982	10,982
	Touch&Go NASO	10,452	7,979	11,910	13,104	13,104
	GCA Box	1,494	586	875	893	893
	Interfacility	1,485	1,269	1,894	1,982	1.982
	Touch&Go NALF	7,226	9,281	13,854	14,490	14.490
A-6	Full LTO	13,401	2,182	0	0	0
	Touch&Go NASO	16,380	2,666	0	0	0
	GCA Box	2,341	381	0	0	0
	Interfacility	2,326	379	0	0	0
	Touch&Go NALF	11,086	1,805	0	0	0
F/A-18	Full LTO	0	1,689	1,689	18,576	23,642
	Touch&Go NASO	0	2,558	2,558	28,133	35,806
	GCA Box	0	0	0	814	1,036
	Interfacility	0	0	0	2,474	3,149
	Touch&Go NALF	0	0	0	18,233	23,206
A-4	Full LTO	4,169	0	0	0	0
	Touch&Go	5,096	0	0	0	0
F-16	Full LTO	936	0	0	0	. 0
	Touch&Go	1,144	0	0	. 0	0
F-5	Full LTO	808	0	0	0	0
	Touch&Go	988	0	0	0	0
TC-4C	Full LTO	638	0	: 0	0	. 0
	Touch&Go	780	0	. 0	0	0
UH-3H	Full LTO	662	0	0	. 0	0
C-12	Full LTO	261	1,669	1,669	1,669	1,669
	Touch&Go	445	2,772	2,772	2,772	2,772
	GCA Box	0	1,101	1,101	1,101	1,101
S-3	Full LTO	1,741	967	967	967	967
	Touch&Go	1,295	938	938	938	938
	GCA Box	1,323	371	371	371	371
T-2C	Full LTO	1,418	0	0	0	0
T-34	Full LTO	1,040	1.040	1,040	1,040	1,040
E-2/C-2	Full LTO NALF	1,074	0	0	0	0
	Touch&Go NALF	25,058	20,478	<del></del>	21,374	21,374
Total		166,172	104,914	112,037	168,839	187,447

### Notes:

- (1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual F-14 aircraft population mix at Oce
- (2) 1993 Full LTO and Touch and Go NASO operations proportioned from NAS Oceana operations data.
- (3) GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at NAS Oceana. 1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.
- (4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
- (5) A-6 aircraft assumed decommissioned by 1997.
- (6) 1999 and Transient aircraft operations derived from NASMOD analysis (ATAC 1997).
- (7) GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

Key:

LTO = Landing and takeoff cycle

GCA = Ground Control Approach

NASO = Naval Air Station Oceana

NALF = Naval Auxiliary Landing Field

Aircraft	Mode	Time in Mode	Fuel Flow	Engines			Emission Factor	ıctor			Moda	Modal Emission Rates	ates	
(Engine Model)		(minutes)	((lb/min)/eng)	) '	VOC (1)	) 	(jlb /1000 lb fuel]/eng)	(Sos	C) OLIVIO	10 OCA	Ç.	(lb/mode)		
F-14A	Idle/Taxi Out	7.0	15.33	2	31.47	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	रहता	200	8 66	(1)	100	11 01	302	7) 01 (7)
(TF30-P-412A)	Ĭ	16.0	15.33		31.42	3.22	55.51	0.54	8.96	15.41	1.58	27.23	0.26	4.40
	Take Off	0.4	79.67	2	0.20	4.79	10.77	0.54	00.0	0.13	3.05	98.9	0.34	00.0
	Climbout	0.4	117.50	2	0.77	19.60	1.38	0.54	2.98	0,07	1.84	0.13	0.05	0.28
	Approach	1.3	71.67	2	1.48	10.74	3.43	0.54	7.98	0.28	2.00	0.64	0.10	1.49
	Taxi In/Idle	5.3	15.33	2	31.42	3.22	55.51	0.54	8.96	5.11	0.52	9.02	0.09	1.46
	T&G Level	1.4	71.67	2	1.48	10.74	3.43	0.54	7.98	020	2.16	69.0	0.11	1.60
	GCA Box	9.7	71.67	2	ે <b>1.</b> 48	10.74	3.43	0.54	7.98	2.06	14.93	4.77	0.75	11.10
	Interfacility	9.1	71.67	2	1.48	10.74	3.43	0.54	7.98	0.34	2.46	0.79	0.12	1.83
	Check Idle	25.0	15.33	2	31.42	3,22	55.51	0.54	8.96	24.08	2.47	42.55	0.41	6.87
									Touch and Go	0.65	00'9	1.46	0.26	3.37
									Full LTO w/hot ref.	27.74	9.69	55.80	96'0	9.54
			I			13513			Full LTO w/o hot ref.	36.41	10.58	71.12	1.11	12.01
									Interfacility	0.34	2,46	0.79	0.12	1.83
									GCA Box	2.06	14.93	4.77	0.75	11.10
ig ig				10				1			2			
14B/D	Idle/Iaxi Out	7.0	19.52	2	3.65	2.77	09.91	0.54	12.38	1.00	0.76	4.54	0.15	3.38
(F110-GE-400)	Hot Refueling Idle	16.0	19.52	2	3.65	2.77	16.60	0.54	12.38	2.28	1.73	10.37	0.34	7.73
	lake Off	0.4	195.32	2	0.40	28.63	0.84	0.54	2.81	90.0	4.47	0.13	0.08	0.44
	Citmbout	4.0.4	195.32	2	94.0	28.63	0.84	0.54	2.81	90.0	4.47	0.13	0.08	0.44
	Approach	1.3	133.03	2	0.26	19.61	0.76	0.54	6.10	0.09	6.78	0.26	0.19	2.11
	laxi In/Idie	5.3	19.52		3,65	2.77	16.60	0.54	12.38	0.76	0.57	3.43	0.11	2.56
	i & C Level	4.1	04.10	7	0.93	8.73	40.	0.54	6.10	0.17	1.57	0.29	0.10	1.09
	CCA BOX	7.6	04.10	7	6,50	8.75	<u>\$</u> :	0.54	6.10	1.18	10.88	2.04	0.67	7.59
	Cherrianning	26.0	04.10	7	6,5	3.73	1.04	0.34	6.10	0.19	1.79	0.34	0.11	1.25
	Check Idle	0.62	76.61	7	CO.C	2.11	19:90	0.54	12.38	3.56	2.70	16.20	0.53	12.08
								1	Touch and Go	0.32	12.83	0.69	0.37	3.64
	:						1	-	rull L1O w/ hot ref.	4.25	18.79	18.87	0.95	16.67
			-	:			:		ruil LIO w/o hot ref.	5.55	19.76	24.70	4:	21.02
	:							T	GCA Box	81.1	10.88	50.0	0.11	67.1
-	1		T	1				T				•		<u>}</u>
A-6	Taxi Out/Idle	7.0	11.33		42.20	1.79	63.78	0.54	00.0	69.9	0.28	10.12	60.0	00.0
(J-52-P-8B)	Hot Refueling Idle	20.0	11.33	2	42.20	1.79	63.78	0.54	00.0	19.13	0.81	28.91	0.24	0.00
	Take Off	0.4	122.83	2	0.93	13.05	0.71	0.54	00.00	60'0	1.28	0.07	0.05	0.00
	Climbout	0.4	72.00	2	0.58	10.10	3.00	0.54	0.00	0.03	0.58	0.17	0.03	0.00
	Approach	1.3	38.33	2	1.72	6.34	10.54	0.54	0.00	0.17	0.63	1.05	0.05	0.00
_	Taxi In/Idle	5.3	11.33	2	42.20	1.79	63.78	0.54	0.00	5.07	0.21	2.66	90.0	00.0
	I&G Level	4.1	38.33	2	1.72	6.34	10.54	0.54	0.00	0.18	89.0	1.13	90.0	0.00
	GCA Box	9.7	38.33	2	1.2	6.34	10.54	0.54	0.00	1.28	4.71	7.84	0.40	00.0
	Interfacility	0.1	58.33	7	7)	0.34	10.54	0.54	0.00	0.21	0.78	1.29	0.07	0.00
	Check late	16.0	11.33	7	07.24	1.79	63.78	0.54	00'0	17.21	0.73	26.01	0.22	0.00
									Touch and Go	0.39	1.89	2.35	0.14	0.00
									Full L.I.O w/ hot ref.	81.18	3.81	47.97	0.53	0.00
_						28.28.32			run LIO W/o not rer.	77.77		45.08	16.0	9.0
			_	-	160000	K. 7			Tatandanii ta.	35.0	2 40	1 30	0.07	100

				MODAI	EMISSION	Table F-3 ARS 2 MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	F.1 2 AIRCRAFT /	VT NAS OC	EANA					
Aircraft (Fraine Model)	Mode	Time in Mode	Fuel Flow	Engines		)	Emission Factor	ctor ell/eng)			Modal	Modal Emission Rates (lb/mode)	ates	
(cugine more)			(8)		(VOC(I)	NOT	93	805	PM10 (2)	VOC (1)	NOX	8	203	PM10 (2)
A-4	Taxi Out/Idle	6.5	11.33		42.20	1.79	63.78	0.54	0.00	3.11	0.13	4.70	0.04	0.00
(J-52-P-8B)	Take Off	0.4	122.83	-	0.93	13.05	11.0	0.54	0.00	50.0	99'0	0.03	0.03	0.00
	Climbout	0.4	72.00	-	0.58	10.10	3.00	0.54	0.00	0.02	0.29	0.09	0.02	0.00
	Approach	1.3	38.33	_	1.72	6.34	10.54	0.54	0.00	0.09	0.32	0.53	0.03	0.00
	Taxi In/Idle	6.5	11.33		42.20	1.79	63.78	0.54	0.00	3.11	0.13	4.70	0.04	00.0
	T&G Level	1.4	38.33	-	1.72	6.34	10.54	0.54	0.00	60'0	0.34	0.57	0.03	0.00
	Check Idle	18.0	11.33	-	42.20	1.79	63.78	0.54	0.00	8.61	0.37	13.01	0.11	00.0
									Touch and Go	0.19	0.95	1.18	0.07	0.00
									Full LTO w/o hot ref.	14.97	1,88	23.05	0.26	0.00
	-1·													
F-16	Taxi Out/Idle	6.5	17.67	-	2.26	3.96	19.34	0.54	60'0	970	0.45	2.22	90.0	0.01
(F100-PW-100)	İ	0.4	736.67	1	0.10	16.50	55.10	0.54	0.00	0.03	4,86	16.24	0.16	0.00
,	Climbout	0.4	173.33	_	50'0	44.00	1.80	0.54	0.83	0.00	3.05	0.12	0.04	90.0
	Approach	1.3	50.00	-	09'0	00.11	3.00	0.54	0.33	0.04	0.72	0.20	0.04	0.0
	Taxi In/Idle	6.5	17.67	-	2.26	3.96	19.34	0.54	60'0	0.26	0.45	2.22	90.0	0.01
	T&G Level	1.4	\$0.00	-	09'0	11.00	3.00	0.54	0.33	0.04	0.77	0.21	0.04	0.02
									Touch and Go	0.08	4.54	0.53	9.11	0.09
									Full LTO w/o hot ref.	0.59	9.54	21.00	0.36	0.088
												15	14	19
F-5	Taxi Out/Idle	6.5	6.67	5	24.25	1.25	159.00	0.54	00:0	2.10	0.11	13.79	0.03	0.00
(J85-GE-21)	Take Off	0.4	177.50	2	0.10	\$.60	36.40	0.54	0.00	0.01	08'0	5.17	0.08	0.00
	Climbout	0.4	53.33	7	0.25	\$.00	21.56	0.54	0.00	0.01	0.21	0.92	0.02	0.00
-	Approach	-1.3	20.00	2	2.58	2.92	46.25	0.54	0.00	0.13	0.15	2.41	0.03	0.00
	Taxi In/Idle	6.5	6.67	7	24.45	1.25	159.00	0.54	0.00	2.12	0.11	13.79	0.05	0.00
	T&G Level	1.4	20.00	2	2.58	2.92	46.25	0.54	0.00	0.14	0.16	2.59	0.03	00.0
									Touch and Go	0.29	0.53	5.91	0.08	0.0
									Full LTO w/o hot ref.	4.38	1.38	36.07	0.22	0.00
		ļ.		:				19		1	•	100	20.0	
F/A-18	Taxi Out/Idle	0.7	10.40	7	20.10	1.10	127.24	9 9	12.38	13.31	0.27	31 47	0.00	28.5
(r404-0E-400)		-	473.28	<b>1</b> iC	0.13	9.22	23.12	0.40	00.0	0.05	3.49	8.75	0.15	00.0
	Climbout	0.4	143.12	2	0.31	25.16	1.05	0.40	2.81	0.04	2.88	0.12	0.05	0.32
	Approach	1.3	66.75	2	0,44	8.37	1.78	0.40	01.9	80'0	1.45	0.31	0.07	90.1
	Taxi In/Idle	5.3	10.40	2	58.18	1.16	137.34	0.40	12.38	6.41	0.13	15.14	0.04	1.36
	T&G Level	1.7	00:09	2	0.44	8.37	1.78	0.40	6.10	0.09	1.71	0.36	0.08	1.24
	GCA Box	0.6	00:09	2	0,44	8.37	1.78	0.40	6.10	0,48	9.04	1.92	0.43	6.59
	Interfacility	1.4	85.00	2	0.38	11.78	1.16	0.40	6.10	0.09	2.80	0.28	0.10	1.45
	Check Idle	12.0	10.40	2	58.18	1.16	137.34	0.40	12.38	14.52	.0.29	34.28	0.10	3.09
	APU	2.5	3.28	-	0,25	6.25	2.00	0.40	0.22	00'0	20'0	0.02	0.00	0.00
					\$2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				Touch and Go	0.20	6.04	0.79	0.20	2.62
						2.9		_	Full LTO w/ hot ref.	28.36	8.39	75.74	0.46	7.38
									Full LTO w/o hot ref.	29.57	8.46	78.62	0.47	7.64
									Interfacility	0.09	2.80	0.28	0.10	1.45
									GCA Box	0.48	9.04	1.92	0.43	6.59

				MODAL	EMISSION	ARS 2 RATES FOR AI	ARS 2 EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	AT NAS O	CEANA					
Aircraft (Engine Model)	Mode	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor (11b/1000 1b fuell/eng)	actor rell/eng)			Moda	Modal Emission Rates	Lates	  -  -
					V0C(I)	NOx	00	802	PM10 (2)	V0C(1)	NOX	CO	802	PM10 (2)
S-3	Taxi Out/Idle	6.5	7.63	2	14.99	1.69	86.06	0.54	3.26	1.49	0.17	9.02	0.05	0.32
(TF34-GE-400)	(TF34-GE-400) Hot Refueling Idle	8.0	7.63	2	14.99	69'1	86.06	0.54	3.26	1.83	0.21	11.11	0.07	0.40
	Take Off	0.4	63.33	2	0.39	7.51	5.95	0.54	2.11	0.02	0.38	0.30	0.03	10
	Climbout	0.4	79.7	2	2.63	3.42	33.57	0.54	6.85	0.02	0.02	0.21	00.0	0.04
	Approach	1.3	79.7	2	2.63	3.42	33.57	0.54	6.85	0.05	0.07	190	100	0.14
	Taxi In/Idle	6.5	7.63	2	14.99	1.69	86.06	0.54	3.26	1.49	0.17	9.02	0.05	0.32
	T&G Level	1.8	79.7	2	2.63	3.42	33.57	0.54	6.85	0.07	0.00	0.93	0.01	0.10
	GCA Box	7.5	79.7	2	2.63	3.42	33.57	0.54	6.85	0.30	0.39	3.86	90.0	0.79
,			and the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of th						Touch and Go	0.14	0.18	1.80	0.03	0.37
									Full LTO w/ hot ref.	4.89	1.01	30.33	0.21	1.33
	1								Full LTO w/o hot ref.	3.06	0.80	19.23	0.15	0.93
									GCA Box	030	0.39	3.86	0.06	0.79
												:		
C-12/TC-4	Taxi Out/Idle	19.0	2.45	2	101.63	1.97	115.31	0.54	00:0	9.46	0.18	10.74	0.05	0.00
(PT6A-41)	Take Off	0.5	8.50	2	1.75	7.98	5.10	0.54	00:00	0.01	0.07	0.04	00.0	0.00
	Climbout	2.1	7.88	2	2.03	7.57	6.49	0.54	0.00	0.07	0.25	0.21	0.02	00.0
	Approach	3.7	4.55	7	22.71	4.65	34.80	0.54	00.00	0.76	0.16	1.17	0.02	0.00
	Taxi In/Idle	7.0	2.45	7	101.63	1.97	115.31	0.54	0.00	3.49	0,07	3.96	0.02	0.00
	T&G Level	2.0	4.55	2	22.71	4.65	34.80	0.54	0.00	0.41	0.08	0.63	0.01	0.00
	GCA Box	7.5	4.55	7	22.71	4.65	34.80	0.54	00.0	1.55	0.32	2.38	0.04	0.00
		:							Touch and Go	1.25	0.49	2.02	0.05	0.00
									Full LTO w/o hot ref.	13.79	0.73	16.12	0.11	0.00
		4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4							GCA Box	1.55	0.32	2.38	0.04	0.00
****	11	1						:		100		7		
UH-3H	Taxi Out/Idle	0.8	2.20	2	130.42	1:43	178.44	0.54	00.00	4.59	0.05	6.28	$0.0\overline{2}$	0.00
(T58-GE-8F)	Take Off	0.0	13.10	7	0.40	5.47	9.03	0.54	00.00	0.00	0.00	0.00	0.00	00.00
	Climbout	5.7	10.45	7	0.80	4.68	14.13	0.54	0.00	01.0	0.08	0.11	0.03	0.00
	Approach	5.7	89.6	7	1.12	4.47	17.28	0.54	00.00	0.13	0.53	2.06	90.0	0.00
	Taxi In/Idle	7.0	2.20	2	130.42	1.43	178.44	0.54	0.00	4.02	0.04	5.50	0.02	0.00
								!	Full LTO w/o hot ref.	8.84	0.71	13.94	0.13	0.00
				endiĝ										:
T-34	Taxi Out/Idle	6.5	1.92	-	50.17	2.43	64.00	0.54	0.00	0.63	0.03	0.80	0.01	0.00
(PT6A-25)	Take Off	0.4	7.08	-	0.00	7.81	1.01	0.54	0.00	0.00	0.02	00.0	0.00	0.00
	Climbout	0.4	29.9	-	0.00	7.00	1.20	0.54	0.00	0.00	0.02	0.00	0.00	0.00
	Approach	1.3	3.58	-	2.19	8.37	23.02	0.54	0.00	10.0	0.04	0.11	0.00	0.00
	Taxi In/Idle	6.5	1.92	1	50,17	2.43	64.00		0.00	0.63	0.03	08.0	0.01	0.00
		-		1	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Action of the second second					The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			



Table F-2 ARS 2

# MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA

Aircraft	Mode	Time in Mode	Fuel Flow	Engines			<b>Emission Factor</b>	ıctor			Modal	Modal Emission Rates	ates	
(Engine Model)		(minutes)	((lb/min)/eng)			=	[lib /1000 lb fuel]/eng)	el/eng)			J	(lb/mode)		
)					VOC(I)	NOX	00	202	PM10 (2)	VOC(1)	NOx	00	802	PM10 (2)
r-2	Taxi Out/Idle	6.3	9.33	2	11.86	3.68	111.86	0.54	00.0	1.44	0.45	13.57	0.07	0.00
(J85-GE-2)	Take Off	0.4	48.17	2	0.45	6.40	21.56	0.54	0.00	0.02	0.25	0.83	0.02	0.00
	Climbout	0.4	35.92	2	0.64	5.67	28.38	0.54	00:00	0.02	0.16	0.82	0.02	0.00
	Approach	1.3	17.42	2	2.40	4.02	63.53	0.54	00:00	0.11	0.18	2.88	0.02	0.00
	Taxi In/Idle	6.5	9.33	2	11.86	3.68	111.86	0.54	00:0	1.44	0.45	13.57	0.07	0.00
									Full LTO w/o hot ref.	3.02	1.48	31.66	0.19	0.00
									· Name of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the stat				:	:
E-2/C-2	Taxi Out/Idle	0.61	86.6	2	19.24	3.53	30.11	0.54	00.00	1 . O. C.	1.34	11.42	0.20	0.00
(T56-A-16)	Take Off	0.5	36.98	2	0.14	10.45	0.65	0.54	00.0		0.39	0.02	0.02	0.00
	Climbout	2.1	36.98	2	0.14	10.45	0.65	0.54	0.00	<b>運、テ3</b>	1.62	0.10	0.08	0.00
	Approach	3.7	33.27	2	0.17	9.93	0.42	0.54	0.00	1	2.44	0.10	0.13	0.00
	Taxi In/Idle	7.0	86.6	2	19.24	3.53	30.11	0.54	0.00	# · · · · ·	0.49	4.21	0.08	0.00
	T&G Level	1.6	15.00	2	0.95	6.52	4.54	0.54	0.00		0.31	0.22	0.03	0.00
								:	Touch and Go	17.72	4.38	0.42	0.24	0.00
									Full LTO w/o hot ref	. 10.05	6.29	15.85	0.52	0.00

: Notes: F-7

(1) Aircraft VOC reported as HC in the form CHy/x

(2) Emission factors equal to 0.00 for PM10 indicate that no factor has been determined (AESO 1996).

(3) Emission factors from AESO Report Number 6-90 and USEPA AP-42.

(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Modal emission rates calculated from data provided by AESO.

(6) T&G, GCA Box and Interfacility level flight TIMs based on flight track profile speeds and distance for F-14, E-2/C-2, F/A-18 and S-3 aircraft. Level TIMs for C-12s and TC-4s were assumed to be the same as E-2/C-2 All other aircraft are assumed to have the same level TIMs as F-14s.

(7) Modal emission rates for T&G operations include approach, climbout, and T&G level modes only.

(8) Modal emission rate for full LTO w/o hot refueling includes APU use (F/A-18 only) and check idle mode.

(9) Modal emission rate for full LTO w/hot refueling does not include APU use (F/A-18 only) or check idle mode.

(10) GCA box and interfacility mode emission rates are presented only for aircraft that conduct low-altitude operations between NAS Oceana and NALF Fentress.

(11) F-14B and F-14D have the same engine types, and therefore, have identical emission rates.

(12) TC-4s are assumed to have the same emission rates as C-12s.

(13) FCLP mode is included in T&G since flight modes are similar.

Key:

VOC = volatile organic compounds LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle NOx = oxides of nitrogen LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle CO = carbon monoxide T&G = touch and go

SO2 = sulfur dioxide GCA = ground control approach

PM10 = particulate matter Interfacility = low altitude operations between NAS Oceana and NALF Fentress

AESO = Aircraft Environmental Support Office

TIM = time in mode

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					AIRCRAFT FO	FT EMISSIONS AT NAS ( FOR 1993 AND 1996-1999	AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	EANA					
	Type of	Operation	Number of	Δ	D:	Ź	NOX		23	Š	202		PM10
	Aircraft		Operations/Year per operat	per operation	1 Total	per operation		per operation		per operation		per operation	:
1993	F-14A	Full LTO w/ hot ref.	3,116	27.74	43,22	69.6	15.10	(ab) 55.80	(IPY) 86.94	(a)	(1PY)	(IID) 9 54	(IPY) 14 87
		Full LTO w/o hot ref.	-	36.41	170.19	10.58	49.45	71.12	332.43		5.20	12.01	56.16
		Touch&Go	-	0.65	4.91	00'9	45.70	1.46	11.10	0.26	1.98	3.37	25.66
		GCA Box	2,178	2.06	2.24	14.93	16.26	4.77	5.19	0.75	0.82	11.10	12.08
		Interfacility	2,164	0.34	0.37	2.46	2.67	0.79	0.85	0.12	0.13	1.83	86.1
	E 17B	E.II 1 TO/ hat 2.0	7 130	367		<b>X</b> • • •	00.00	10.01	** 88	k K	Ç.	22.2	K
	L-14D	Full 1.TO w/o hot ref		2.2	4.74	10.79	63.18	18.87	70.07	0.95	1.02	16.67	17.81
		Touch&Go	!	0.32	69:1	12.83	67.03	690	360	0.14	3.00	364	15 64
	:	GCA Box	1,494	1.18	0.88	10.88	8.13	2.04	1.52	19:0	0.50	7.59	5.67
		Interfacility	1,485	0.19	0.14	6.7	1.33	0.34	0.25	0.11	80.0	1.25	0.93
	2.1	K 11 S#1 II H	ic ic				2		100				
	0-V	Full LTO W/ not ref	1,500	31.18	22.24	3.81	0.38	47.97	80.37	0.53	0.89	00.00	00:00
		Touch&Go	-	03.0	3.10	777	15.51	7.10	10.022	0.31	2.30	900	900
		GCA Box	2 341	1.28	\$15	4.71	5 5	7 84	21.6	0.14	0.47	000	000
		Interfacility	2,326	0.21	0.25	0.78	060	1.29	1.50	0.07	0.08	900	00.0
													3
	A-4	Full LTO w/o hot ref.	4,169	14.97	31.21	1.88	3.9[	23.05	48.05	0.26	0.54	00.00	00.00
		Touch&Go	5,096	61.0	0.50	0.95	2.41	1.18	3.00	0.07	81.0	0.00	0.00
	E.15	Eull TTO w/o hot raf	038	0 40	96.0	0.54	7 1 16	100	0 03	26.0	<u> </u>		
	1	Toucher Co		0.00	200	1 51	7 50	20.12	0.00	0.00	200	0.09	0.04
	:	OORGIIGO	¥.	0.00	CO'O	+;+	4.39	0.33	0.30	100	90.0	60.0	\$0.0
	F-5	Full LTO w/o hot ref.	808	4.38	1.11	1.38	0.56	36.07	14.57	0.22	60.0	00.00	00.00
		Touch&Go	886	0.29	0.14	0.53	0.26	5.91	2.92	0.08	0.04	0.00	00.00
							No.	:		,			
	TC-4	Full LTO w/o hot ref.	638	13.79	4.40	0.73	0.23	16.12	5.14	0.11	0.03	0.00	00.00
		Touch&Go	780	1.25	0.49	0.49	0.19	2.02	0.79	0.05	0.02	00.0	00.00
	UH-3H	Full LTO w/o hot ref.	662	8.84	2.92	0.71	0.23	13.94	4.61	0.13	0.04	00.00	0.00
	C-12	Full LTO w/o hot ref	261	13.79	1.80	0.73	0.09	1617	5.10	įį	, j	<u> </u>	oj ig
	:	Touch&Go	445	1.25	0.28	0.49	0.11	2.02	0.45	0.05	0.01	00.00	0.00
		Eull I TO w/ hot ref	028	00 V	116	N. T.	K V	30.33	13.70	7.6		*	i c
	C-C	Full Tro w/ house.	070	4.02	61.4	10.1	‡ * ×	50.33	02.61	0.21	0.09	25.5	0.58
		Full L10 w/o not ret.	0/8	3.00	1.33	0.80	0.55	19.23	8.37	0.15	0.06	0.93	0.41
		I ouchood	262,1	\$1.0 0.14	60.0	0,18	0.12	1.80	1.17	0.03	0.02	0.37	0.24
		GCA BOX	1,523	00.00	0.20	U,39	07.0	3.80	7.33	90.0	0.04	0.79	0.52
	T-2C	Full LTO w/o hot ref.	1,418	3.02	2.14	1.48	1.05	31.66	22.45	61.0	0.14	0.00	00.0
	ŧ	×	V.					i	i c	8	i		
	I-34	Full L1O w/o hot ret.	040,1	1.20	86 80	0.14	0.07	1.71	0.89	0.02	0.01	0.00	00.0
	Lotai		11,41/		C'ME .		1c.ccc		1018.55		23.55		223.43

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Particular   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Ope				*		EMISSIONS R 1993 AND	1996-1999						
Afternit	Type o		Number of	VOI	3	N. C. C. C. C. C. C. C. C. C. C. C. C. C.	<b>1</b> 0	<b>1</b>		). 		P	410
F-14A   Pull LTO When ref   7.316   0.545   7.174   7.184   0.054   7.184   7.184   0.054   7.184   0.054   7.184   0.054   7.184   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054   0.054	Aircra		Operations/Year	per operation	Total	per operation		per operation	Total	per operation	Total	per operation	Total
Full LTO we harred   7216   5544   13156   138   147   147   256   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156   156			2.405	27.74	33.36	69.6	11.65	55.80	67.10	96'0	116	9.54	11.47
TroubAction   13.13   0.655   3.98   6.00   3.659   1.45   1.88   0.05   0.15   0.11   1.10	<u>!</u>	Ī		36.41	131.36	10.58	38.17	71.12	256.58		4.02	12.01	43.35
Total Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board   Local Board		Touch&Go		0.65	3.98	00'9	36.99	1.46	86.8	0.26	1.60	3.37	20.77
Fell LTO w/hoiref   1,788		GCA Box	1,048	2.06	1.08	14.93	7.83	4.77	2.50	0.75	0.39	11.10	5.82
Fell LTO w/hoi ref		Interfacility	1,768	0.34	0:30	2.46	2.18	0.79	0.70	0.12	0.11	1.83	1.62
Full LTO w/w bot ref   1,728   4,25   3,56   1,819   16,24   18,77   16,30   19,55   16,57   16,57   16,57   16,50   19,50   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57   16,57		<del> </del>											
Fell LTO w/bot ref. 5,185 5,33 14,34 19,76 5,123 24,70 6,40 2 114 2,96 210.2	F-14B/	-	<u> </u>	4.25	3.67	18.79	16.24	18.87	16.30	0.95	0.82	16.67	14.40
Touch&Co   7379   0.32   1.29   1.28   5117   0.65   2.75   0.37   1.47   364     Touch&Co   7379   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15     Touch&Co   2.56   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15     Fall LTO w/o hot ref   1.36   2.327   2.35   3.18   1.04   47.97   13.08   0.53   0.15   0.00     Fall LTO w/o hot ref   1.36   2.327   2.35   3.72   3.18   0.14   0.00   0.00     Fall LTO w/o hot ref   1.37   2.35   2.35   3.72   3.05   0.24   0.00   0.00     Fall LTO w/o hot ref   1.267   2.836   5.99   8.39   1.77   75.74   15.99   0.44   0.00   0.00     Fall LTO w/o hot ref   1.267   2.836   5.99   8.39   1.77   75.74   15.99   0.44   0.00   0.00     Fall LTO w/o hot ref   1.267   2.836   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   4.89   1.18   1.01   0.024   0.01   0.00   0.00     Fall LTO w/o hot ref   1.484   4.89   0.00   0.71   0.00   0.19   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0.00   0.00   0.00     Fall LTO w/o hot ref   1.484   0.00   0.00   0.00   0.00   0		Full LTO w/o hot ref.		5.53	14.34	19.76	51.23	24.70	64.02	1.14	2.96	21.02	54.48
CGCA Box   386   L18   0.33   10.88   31.9   204   0.60   0.67   0.20   7.59     Interfacility   1.269   0.19   0.12   1.79   1.14   0.34   0.21   0.21   0.07   1.25     Full LTO w/ hor ref   345   31.18   8.50   3.38   1.04   47.97   13.08   0.53   0.15   0.00     Full LTO w/ hor ref   1.636   29.27   23.95   3.72   3.73   3.14   0.14   0.19   0.00     Full LTO w/ hor ref   1.266   0.39   0.22   0.24   4.11   0.90   7.84   1.49   0.04   0.00     Full LTO w/ hor ref   1.267   23.35   23.35   23.35   3.36   0.24   0.00   0.00     Full LTO w/ hor ref   4.84   4.89   1.18   1.01   0.24   0.77   1.01   0.20   0.25   0.25     Full LTO w/ hor ref   4.84   4.89   1.18   1.00   0.24   0.77   0.79   0.10   0.20   0.25     Full LTO w/ hor ref   4.84   4.89   1.18   1.00   0.24   0.77   0.05   0.05   0.05     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.19   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   1.18   0.00   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   0.14   0.00   0.17   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   0.15   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   0.14   0.00   0.17   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   0.15   0.00   0.00     Full LTO w/ hor ref   1.669   3.79   0.00   0.00     Full LTO w/ hor ref   1.669   0.00   0.01   0.00   0.00     Full LTO w/ hor ref   1.669   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00   0.00   0.00   0.00     Full LTO w/ hor ref   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     Fu		Touch&Go	7,979	0.32	1.29	12.83	51.17	69.0	2.75	0.37	1.47	3.64	14.54
Full LTO w/hot ref.   1536   2537   2335   1.74   4737   1308   0.533   0.15   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00		GCA Box	586	81.1	0.35	10.88	3.19	2.04	09:0	0.67	0.20	7.59	2.22
Full LTO w/ hot ref.   345   3118   8.50   381   1.04   4797   1308   0.531   0.15   0.00   Full LTO wo hot ref.   1,636   22.77   23.35   3.72   3.05   45.08   36.88   0.51   0.42   0.00   Touch&Go   2,566   0.39   0.32   1.89   2.53   2.35   3.14   0.14   0.19   0.00   Indicatility   379   0.21   0.04   0.78   0.15   0.24   0.07   0.01   0.00   Indicatility   379   0.21   0.04   0.78   0.15   0.24   0.07   0.01   0.00   Indicatility   379   0.21   0.04   0.78   0.15   0.24   0.07   0.01   0.00   Indicatility   379   0.25   0.25   0.25   0.24   0.07   0.01   0.00   I Full LTO w/o hot ref   484   4.89   1.18   1.01   0.24   3.03   1.31   0.20   0.25   0.25   I Full LTO w/o hot ref   484   4.89   1.18   1.01   0.24   3.03   0.05   0.05   0.00   I Full LTO w/o hot ref   6.69   0.74   0.80   0.19   19.23   4.63   0.15   0.04   0.93   I Full LTO w/o hot ref   6.69   0.74   0.80   0.19   19.23   4.63   0.15   0.00   0.00   I Full LTO w/o hot ref   6.69   13.79   11.51   0.73   0.00   0.11   0.00   0.00   I Full LTO w/o hot ref   6.69   13.79   11.51   0.73   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   13.79   11.51   0.73   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   13.79   11.51   0.73   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   0.74   0.00   0.71   0.00   0.13   0.00   0.00   I Full LTO w/o hot ref   6.69   0.74   0.00   0.74   0.00   0.00   0.00   I Full LTO w/o hot ref   6.69   0.04   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   0.04   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   0.04   0.05   0.00   0.00   I Full LTO w/o hot ref   6.69   0.04   0.00   0.00   0.00   I Full LTO w/o hot ref   0.04   0.00   0.01   0.00   0.00   0.00   I Full LTO w/o hot ref   0.04   0.00   0.00   0.00   0.00   I Full LTO w/o hot ref   0.04   0.00   0.00   0.00   0.00   0.00   I Full LTO w/o hot ref   0.04   0.00   0.00   0.00   0.00   0.00   0.00   I Full LTO w/o hot ref   0.04   0.00   0.00   0.00   0.00   0.00   0.00   0.00   I Full LTO w/o hot ref   0.00   0.00   0.00   0.00   0.00	:	Interfacility	1,269	0.19	0.12	1.79	1.14	0.34	0.21	0.11	0.07	1.25	
Full LTO w/ hot ref.         545         3118         8.50         381         1.04         4797         1308         0.53         0.15         0.00           Full LTO w/ hot ref.         1,566         2.937         2.937         2.395         3.12         471         0.98         3.58         0.51         0.00           GCA Box         381         1.28         0.24         4.71         0.99         7.84         1.49         0.40         0.08         0.00           Interfacility         379         0.21         0.04         0.78         0.15         1.29         0.40         0.08         0.00           Full LTO w/o bot ref.         1.567         28.36         5.99         8.39         1.77         75.74         15.99         0.46         0.10         7.38           Full LTO w/o bot ref.         1.567         28.36         5.99         8.39         1.77         75.74         15.99         0.46         0.10         7.38           Full LTO w/o bot ref.         1.567         28.36         5.99         8.39         1.77         75.74         15.99         0.46         0.10         7.38           Full LTO w/o bot ref.         1.84         4.89         1.18         1.01 <td>!</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>:</td> <td></td>	!											:	
Full LTO w/o hot ref   1636   2937   2395   372   365   4508   3688   051   042   000     Touch&Co	A-6		545	31.18	8.50	3.81	1.04	47.97	13.08	0.53	0.15	00:0	00.0
Touch&Go		Full LTO w/o hot ref.	-	29.27	23.95	3.72	3.05	45.08	36.88	0.51	0.42	0.00	:- L
GCA Box   38   128   0.24   471   0.50   784   149   0.40   0.08   0.00	<u>:</u> :	Touch&Go	2,666	0.39	0.52	1.89	2.53	2.35	3.14	0.14	61.0	00.0	00.00
Full LTO w/o hot ref.   422   28.36   5.99   8.39   1.77   75.74   15.99   0.46   0.10   7.38   7.64   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.20   1.	:		381	1.28	0.24	4.71	06.0	7.84	1.49	0.40	0.08	0.00	00.00
Full LTO w/ hot ref. 422 28.36 5.99 8.39 1.77 75.74 15.99 0.46 0.10 7.38 7.4			379	0.21	0.04	0.78	0.15	1.29	0.24	0.07	0.01	00.00	00.00
Full LTO w/ hot ref.   422   28.36   5.99   8.39   1.77   75.74   15.99   0.46   0.10   7.38   7.38   Full LTO w/ hot ref.   1,267   29.57   18.73   8.46   5.36   78.62   49.79   0.47   0.30   7.64   7.64   7.72   0.79   1.01   0.20   0.25   2.62   2.62   2.538   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.25   0.		<u></u>											
Full LTO w/o hot ref         1.267         29.57         18.73         8.46         5.36         78.62         49.79         0.47         0.30         7.64           Touch&Go         2,558         0.20         0.26         6.04         7.72         0.79         1.01         0.20         0.25         2.62           Full LTO w/hot ref         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/hot ref         484         3.06         0.74         0.08         0.19         1.80         0.85         0.03         0.04         0.33           GCA Box         371         0.30         0.06         0.19         1.80         0.85         0.03         0.01         0.37           GCA Box         371         0.30         0.06         0.39         0.07         1.86         0.72         0.06         0.01         0.09           Full LTO w/o hot ref         1,669         18.84         0.00         0.71         0.00         0.13         0.00         0.13         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td>F/A-1.</td> <td></td> <td></td> <td>28.36</td> <td>2.99</td> <td>8.39</td> <td>1.77</td> <td>75.74</td> <td>15.99.</td> <td>0.46</td> <td>01.0</td> <td>7.38</td> <td>1.56</td>	F/A-1.			28.36	2.99	8.39	1.77	75.74	15.99.	0.46	01.0	7.38	1.56
Full LTO w/b hot ref.         484         4.89         LTB         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/b hot ref.         484         4.89         LTB         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/b hot ref.         484         4.89         LTB         0.04         0.19         19.23         4.65         0.13         0.04         0.93           Touch&Go         938         0.14         0.07         0.18         0.09         1.80         0.72         0.05         0.01         0.37           GCA Box         371         0.30         0.071         0.00         13.94         0.00         0.13         0.00         0.00           Full LTO w/b hot ref.         1,669         13.79         11.51         0.73         0.66         15.42         0.05         0.00         0.00           GCA Box         1,101         1.55         0.85         0.32         0.17         0.06         0.05         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.0	:	Full LTO w/o hot ref.		29.57	18.73	8.46	5.36	78.62	49.79	0.47	0.30	7.64	4.84
Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         4.89         1.18         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Go         938         0.14         0.07         0.18         0.09         1.80         0.65         0.01         0.37           GCA Box         371         0.39         0.06         0.71         0.00         13.94         0.00         0.01         0.79           Full LTO w/o hot ref.         1,659         13.79         11.51         0.73         0.61         15.12         13.45         0.11         0.00         0.00           Full LTO w/o hot ref.         1,101         1.55         0.35         0.32         0.17         2.38         0.05         0.06         0.00           GCA Box         1,101         1.55         0.66         0.17         2.38         1.31         0.04         0.02         0.01         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.17         1.71         0.89         0.002         0.01 </td <td>:</td> <td>Touch&amp;Go</td> <td>2,558</td> <td>0.20</td> <td>0.26</td> <td>6.04</td> <td>7.72</td> <td>0.79</td> <td>10.1</td> <td>0.20</td> <td>0.25</td> <td>2.62</td> <td></td>	:	Touch&Go	2,558	0.20	0.26	6.04	7.72	0.79	10.1	0.20	0.25	2.62	
Full LTO w/o hot ref.         484         3.06         0.74         6.080         0.15         7.55         7.55         0.21         0.05         0.03           Full LTO w/o hot ref.         484         3.06         0.74         6.080         0.18         0.09         1.80         0.85         0.03         0.01         0.37           GCA Box         371         0.30         0.06         0.39         0.07         0.00         13.94         0.06         0.01         0.79           I Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.61         16.12         13.45         0.00         0.00           Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.61         16.12         0.05         0.00         0.00           GCA Box         1,101         1.35         0.08         0.17         2.38         0.05         0.00         0.00           Full LTO w/o hot ref.         1,040         1.26         0.04         0.07         1.71         0.07         0.07         0.07         0.07         0.07         0.01         0.00	ic ic		707	<b>V6 </b>	011	<b>S</b>	KCA	20 22	7 22	0.31	200	1.21	ŭ 12
Touch&Go   938   0.14   0.07   0.18   0.09   1.80   0.85   0.03   0.01   0.37	) :	-!-	-	106	0.74	0 80	010	19.23	465	51.0	0.00	0.03	0.53
GCA Box   371   0.30   0.06   0.39   0.07   3.86   0.72   0.06   0.01   0.79	:	Touch&Go		0.14	0.02	XI C	000	1 80	0.85	0.03	100	0.37	
Full LTO w/o hot ref	:	GCA Box	371	0.30	0.06	0.39	0.07	3.86	0.72	90.0	0.01	0.79	0.15
Full LTO w/o hot ref.   0	· .												
Full LTO w/o hoi ref.         1,669         13.79         ILSI         0.73         0.61         16.12         13.45         0.11         0.09         0.00           Touch&Go         2,772         1.25         1.33         0.49         0.68         2.02         2.80         0.05         0.06         0.00           GCA Box         1,101         1.35         0.85         0.32         0.17         2.38         1.31         0.04         0.00         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00	UH-31	:	1	8.84	00:0	0.71	0.00	13.94	0.00	0.13	0.00	00.00	0.00
Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.61         16.12         13.45         0.11         0.09         0.00           Touch&Go         2,772         1.25         1.73         0.49         0.68         2.02         2.80         0.05         0.06         0.00           GCA Box         1,101         1.55         0.85         0.32         0.17         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00											: !	:	
Touch&Go         2,772         1.25         1.73         0.49         0.68         2.02         2.80         0.05         0.06         0.00           GCA Box         1,101         1.55         0.85         0.32         0.17         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00	C-12	:	!	13.79	11.31	0.73	0,61	16.12	13.45	0.11	60.0	00.00	00.0
GCA Box         1,101         1.55         0.85         0.32         0.17         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00		Touch&Go	2,772	1.25	1.73	0.49	0.68	2.02	2.80	0.05	90.0	0.00	
Full LTO w/o hot ref. 1,040   L26   0.66   0.14   0.07   1.71   0.89   0.02   0.01   0.00		GCA Box	1,101	1.55	0.85	0.32	0.17	2.38	1.31	0.04	0.02	00.00	00.0
Full LIO W/o hot ret. 1,040   1.26   0.05   0.14   0.01   0.39   0.02   0.01   0.00									d	<b>S</b>	ď	d	
	T-34			1.26	0.66	0.14	0.07	1.71	0.89	0.02	0.01	0.00	0.00

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Touch&Go   11,910   0,32   12,83   65,38   0,69   4,10   0,37   2,19
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						ARS 2	ก						
				<b>∢</b>	IRCRAFT I FOF	AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	AT NAS OC 1996-1999	EANA					
	Type of	Operation	Number of	1) 30A		NON		<u> </u>	ľ	202	1	PMIO	
	Aircraft		Operations/Year per operation	per operation	Total	per operation	Total	per operation	Total	per operation	Total	per operation	Total
	· .			<b>a</b>	(TPX)	9	(LLL)	(gp)	(TPY)	<b>@</b>	(TPY)	(A)	(TP
1998	F-14A	Full LTO w/ hot ref.	1,717	27.74	23.82	69.6	8.32	55.80	47.91	96.0	0.83	9.54	2.0
		Full LTO w/o hot ref.	5,152	36.41	93.78	10.58	27.25	71.12	183.18		2.87	12.01	30.9
		Touch&Go	10,274	.0.63	331	00'9	30.82	1.46	7.49	0.26	1.33	3.37	17.3
		GCA Box	1,010	2.06	1.04	14.93	7.54	4.77	2.41	0.75	0.38	11.10	5.6
		Interfacility	1,253	0.34	0.21	2.46	1.54	0.79	0.49	0.12	80.0	1.83	
								i i	e e	je je			10
	F-14B/D	Full LTO w/ hot ref.	2,746	4.25	5.83	18.79	25.79	18.87	25.90	0.95	1.31	16.67	77
		Full LTO w/o hot ref.	8,237	5.53	22.77	19.76	81.39	24.70	101.71	1.14	4.70	21.02	86.
	!	Touch&Go	13,104	0.32	2.12	12.83	84.04	69'0	4.51	0.37	2.41	3.64	23.
•		GCA Box	893	1.18	0.53	10.88	4.86	2.04	0.91	0.67	0.30	7.59	
		Interfacility	1,982	61.0	0.19	1.79	1.78	0.34	0.33	0.11	0.11	1.25	
	: :												
	F/Ā-18	Full LTO w/ hot ref.	4,644	28.36	65.85	8.39	19.47	75.74	175.87	0.46	1.07	7.38	17.14
	:	Full LTO w/o hot ref.	13,932	29.57	205.98	8.46	58.94	78.62	547.64	0.47	3.29	7.64	53.
		Touch&Go	28,133	0.20	2.84	6.04	84.97	0.79	11.14	0.20	2.77	2.62	36.
		GCA Box	814	0.48	61.0	9.04	3.68	1.92	0.78	0.43	0.18	6.59	2.0
		Interfacility	2,474	60.0	0.11	2.80	3.47	0.28	0.34	0.10	0.12	1.45	=
					200								
	S-3	Full LTO w/ hot ref.	484	4.89	1.18	10.1	0.24	30.33	7.33	0.21	0.05	1.33	0
		Full LTO w/o hot ref.	484	3.06	0.74	08.0	0.19	19.23	4.65	0.15	0.04	0.93	0.7
	:	Touch&Go	938	0.14	0.07	0.18	60'0	1.80	0.85	0.03	0.01	0.37	0.17
		GCA Box	371	0.30	0.06	0.39	0.07	3.86	0.72	90.0	0.01	67.0	<u>.</u> 0
									:				
	C-12	Full LTO w/o hot ref.	699'!	13.79	11.51	0.73	0.61	16.12	13.45	0.11	60.0	00.00	0.0
		Touch&Go	2,772	1.25	1.73	0.49	99.0	2.02	2.80	0.05	90.0	0.00	00.0
		GCA Box	1,101	1.55	0.85	0.32	0.17	2.38	1.31	0.04	0.02	0.00	0.0
								1	:				
	T-34	Full LTO w/o hot ref.	1,040	1.26	99:0	0.14	0.07	1.71	0.89	0.02	0.01	00.00	0.00
	_			The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa						The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa			

Table F-3 ARS 2

	Type of	Operation	Number of	ΟÀ	E	C(0) Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Section 19 Sectio	Ox	2	0.	S	<b>202</b>	Ь	PM10
	Aircraft		Operations/Year per	per operation	Total	per operation	Total	per operation	Total	per operation	_	per operation	
				<b>(a)</b>	(TPV)	<b>3</b>	(TPY)	(lb)	(TPY)	<b>a</b>	(TPY)	(lp)	E
1999	F-14A	Full LTO w/ hot ref.	1,717	27.74	23.82	9.69	8.32	55.80	47.91	96'0	0.83	9.54	∞
		Full LTO w/o hot ref.	5,152	36.41	93.78	10.58	27.25	71.12	183.18	1.11	2.87	12.01	30
		Touch&Go	10,274	0.65	3.31	90.9	30.82	1.46	7.49	0.26	1.33	3.37	17.30
		GCA Box	010'1	2.06	1.04	14.93	7.54	4.77	2.41	0.75	0.38	11.10	5
		Interfacility	1,253	0.34	0.21	2.46	1.54	0.79	0.49	0.12	0.08	1.83	
						100000					:		:
	F-14B/D	Full LTO w/ hot ref.	2,746	4.25	5.83	18.79	25.79	18.87	25.90	0.95	131	16.67	22
		Full LTO w/o hot ref.	8,237	5.53	22.77	19.76	81.39	24.70	161.71	1.14	4.70	21.02	98
		Touch&Go	13,104	0.32	2.12	12.83	84.04	69'0	4.51	0.37	2.41	3.64	23
		GCA Box	893	1.18	0.53	10.88	4.86	2.04	16.0	19.0	0.30	7.59	3.
		Interfacility	1,982	0.19	0.19	1.79	1.78	0.34	0.33	0.11	0.11	1.25	1.24
	4	k i i											
	F/A-18	rull LIO w/ hot ret.	5,911	28.36	83.80	8.39	24.78	75.74	223.84	0.46	1.36	7.38	21
		Full LTO w/o hot ref.	17,732	29.57	262.16	8.46	75.02	78.62	66.969	0.47	4.19	7.64	67
		Touch&Go	35,806	0.20	3.61	6.04	108.15	0.79	14.18	0.20	3.52	2.62	46.
		GCA Box	1,036	0.48	0.25	9.04	4.68	1.92	00.1	0.43	0.22	6.59	·
		Interfacility	3,149	0.09	0.14	2.80	4.41	0.28	0.43	0.10	0.15	1.45	2.29
						The second second second					:	:	!
	S-3	Full LTO w/ hot ref.	484	4.89	1.18	101	0.24	30.33	7.33	0.21	0.05	1.33	0
		Full LTO w/o hot ref.	484	3.06	0.74	080	0.19	19.23	4.65	0.15	0.04	0.93	0.23
		Touch&Go	938	0.14	0.07	81.0	60.0	1.80	0.85	0.03	0.01	0.37	.0
		GCA Box	371	0.30	90.0	0.39	0.07	3.86	0.72	90.0	0.01	0.79	0.15
	11				The St. Constitution				:	:	:		
	C-15	Full LTO w/o hot ref.	1,669	13.79	11.51	0.73	19.0	16.12	13.45	0.11	0.09	00.00	0.00
		Touch&Go	2,772	1.25	1.73	0.49	89.0	2.02	2.80	0.05	90.0	00.0	00.0
		GCA Box	101,1	1.55	0.85	0.32	0.17	2.38	1.31	0.04	0.02	00.00	0.0
_	1								:	:			:
	T-34	Full LTO w/o hot ref.	1,040	1.26	99.0	0.14	20.0	1.71	0.89	0.02	0.01	00.00	0.00
	Total		118,858		520.36		492.52		1343.29		24.06		344

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.
(2) Number of GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at Oceana.

1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.

(3) 1993 Full LTO and Touch and Go NASO proportioned from air traffic operation records.

(4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
(5) A-6 aircraft assumed decommissioned by 1997.
(6) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997).
(7) Aircraft VOC reported as HC in the form CHy/x

(8) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(9) LTOs for GCA box and interfacility flights include only the level portion of those operations. Takcoff and landings for these operations are accounted for under full LTO or T&G.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide Key.

SO2 = sulfur dioxide PM10 = particulate matter

LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach

TPY = tons per year lb = pounds

02/17/98 07:

		10		(TPY)	17.70		13.17		0.00	0.00		0.00	30.87	:	22.10		16.91	0.00	0.00	00.0	39.01		22.58		25.24		0.00	0.00	
		4	per operation	(B)	3.37		3.64		00.0	0.00		0.00	:		3.37		3.64	0.00	0.00	00.0			3.37		3.64	1	0.00	0.00	
		1	Total	(TPY)	1.37		1.33		0.28	3.04		0.79	6.81		1.70		1.71	0.00	2.49	0.13	6.03		1.74		2.55		0.00	2.59	
		807	per operation	(qp)	0.26		0.37		0.52	0.24		0.14			0.26		0.37	0.52	0.24	0.14			0.26		0.37	i i	0.52	0.24	_
		li İ!	Total	(TPY)	7.66		2.49		8.51	5.29		13.05	37.00		9.56		3.19	00.00	4.32	2.12	19.20		9.77	1	4.77		0.00	4.51	
	RESS	03	per operation	<b>(B</b> )	1.46		69.0		15.85	0.42		2.35			1.46		69.0	15.85	0.42	2.35			1.46		0.69		15.85	0.42	
₹	AIRCRAFT EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	×		(Table)	31.53		46.34		3.38	54.89		10.50	146.63		39.36		59.52	00.0	44.85	1.71	145.45		40.21		88.85		00.0	46.82	200 C 400 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C 200 C
Table F-4 ARS 2	FOR 1993 AND 1996-1999	XON	per operation	<b>(1)</b>	00'9		12.83		6.29	4.38		1.89			00'9		12.83	6.29	4.38	1.89		行の意味	6.00		12.83		6.29	4.38	一 は なんになること ののののできる
	AIRCRAFT F	9		E SE	3.39		117		5.40	1.37		2.16	13.48		4.23		1.50	0.00	1.12	0.35	7.20		4.32		2.24	S. S. S. S. S. S. S. S. S. S. S. S. S. S	0.00	1.17	というできることに くのかんかい
		20A	per operation	2	0.65		0.32		10.05	0.11		0.39			9.05		0.32	10.05	0.11	0.39			0.65		0.32		10.05	11.0	第19年の「父母の行うによる」
		Number of	perations/Yea	·	10,511		7,226		1,074	25,058		11,086	54,955		13,124		9,281	0	20,478	i,805	44,687		13,406		13,854		0	21,374	
		Operation	Type		Touch&Go		Touch&Go		Full LTO	Touch&Go		Touch&Go		·	Touch&Go		Touch&Go	Full LTO	Touch&Go	Touch&Go		F	Touch&Go		Touch&Go		Full LTO	Touch&Go	_
		Type of	Aircraft		F-I4A		F-14B/D		E-2/C-2			A-6	Total	T	F-14A		F-14B/D	E-2/C-2		Ā-6	Total		F-14A	:	F-14B/D		E-2/C-2	-	-
	,				1993	<u>.l.</u>		<u> </u>	-	·	-1				9661	<del></del>		•				:	1661	<u> </u>				-	=

		10	Total	(TPY)	16.03	26.40		23.93	00.00	00.00	96.36		16.03	26.40		30.46	00.00	00.0	72.89
		PM10	per operation	<b>(</b>	3.37	3.64		2.62	0.00	00.00		7	3.37	3.64		2.62	00.00	00.00	
		20	Total	(TPY)	1.24	2.67		1.79	 0.00	2.59	8.29		1.24	2.67		2.28	00.00	2.59	87.8
		802	per operation	(g)	0.26	0.37		0.20	0.52	0.24			0.26	0.37		0.20	0.52	0.24	
,			Total	(TPY)	6.94	4.99		7.22	00.0	4.51	23.66		6.94	4.99		61.6	0.00	4.51	25.63
	RESS	00	per operation	(g)	1.46	69:0		6.79	15.85	0.42			1.46	69.0		0.79	15.85	0.42	
4	1996-1999	X.	Total	(TPV)	28.55	92.93	Section Book and	55.07	0.00	46.82	223.37		28.55	92.93		70.09	00:00	46.82	238.39
Table F-4 ARS 2	AIRCRAFT EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	YON	per operation	(IB)	9.00	12.83		90'9	6.29	4.38			6.00	12.83	多 第 第 第	6.04	629	4.38	
	AIRCRAFI	(9)	Total	(TPV)	3.07	2.34		1.84	0.00	1.17	8,42		3.07	2.34		2.34	00'0	1.17	8.92
		(e)	per operation	(1b)	0.65	0.32		0.20	10.05	0.11			0.65	0.32		0.20		0.11	
		Number of	Operations/Year per operation		9,519	14,490		18,233	0	21,374	63,616		9,519	14,490		23,206	0	21,374	68,589
		Operation	Type		Touch&Go	Touch&Go		Touch&Go	Full LTO	Touch&Go			Touch&Go	Touch&Go		Touch&Go	Full LTO	Touch&Go	
	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Type of	Aircraft		F-14A	F-14B/D		F/A-18	E-2/C-2		Total		F-14A	F-14B/D		F/A-18	E-2/C-2		Total
					1998	 	. 1						1999						
		<u></u>		_		 <del></del>			 	-10-00-		_		 F.	-1	4	 		

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) 1993 Touch and Go proportioned from air traffic operation records and number of interfacility flights.
(3) 1997 operation data taken from baseline scenario data in Wyle (1997).
(4) A-6 aircraft assumed decommissioned by 1997.
(5) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997), 1996 and 1998 E-2/C-2 operations assumed same as 1999.
(6) Aircraft VOC reported as HC in the form CHy/x
(7) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = suffur dioxide PM10 = particulate matter

Key:

TPY = tons per year

LTO = landing and takeoff cycle

02/17/98 10:4

	<b>a</b>	missions fron	Ground S	Emissions from Ground Support Equipment at NAS Oceana	ipment at N	AS Ocean	•				
		VOC	C	NOX	×	٥	00	S	SOZ	PK	PM-10
	Fuel Consumption (gal/yr)	15/1000 gail	Total (TPX)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1993 Tow Tractors: (a)			10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To 10 To								
A/S32A-30A	0968	64.60	0.29	436.67	1.96	268.50		31.10	0.14	46.50	0.21
TA-35	254	64.60	0.01	436.67	90.0	268.50	0.03	31.10	000	46.50	0.0
MD-3/A/S32A-31A	4843	64.60	0.16	436.67	1.06	268.50	0.65	31.10	0.08	46.50	0 11
TA-75	17115	122.00	1.04	146.00	1.25	3250.00	27.81	5.20	0.04	8.27	007
A/S32A-42	7200	64.60	0.23	436.67	1.57	268 50	0.97	31.10	0.11	46.50	0.0
JG-75	104	122.00	10.0	146.00	100	3250.00	0.17	5.20	000	8.27	000
A/S32A-30		122.00	0.05	146.00	0.07	3250.00	1.46	5.20	00.0	8.27	0.00
Flight Line Electric Power	Power Units										
NC8A (6)		49.23	0.37	604.17	4.51	130.15	16.0	39.73	0.30	42.47	0.32
NC10C (6)	3180	49.23	0.08	604.17	96.0	130.15	0.21	39.73	0.06	42.47	0.07
Jet Engine Start Un	ts								!		
A/M47A-4/NCPP-105 (b)	05 (b) 41932	49.23	1.03	604.17	12.67	130.15	2.73	39.73	0.83	42.47	0.89
A/S47A-1 (6)	712	49.23	0.02	604,17	0.22	130.15	0.05	39.73	10.0	42.47	0.02
GTC-85 (c)	10101	0.13	00'0	3.88	0.02	14.83	0.07	0.54	0.00	00:0	00.00
17	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon										
A/M32C-17	2105	10.03	0.05	504 17	0 64	13015	0.14	10 71	700	15 77	700
A/M27T-5	066	4071	000	604 17	05.0	130 13	700	30.73	0.04	- 12 TY	5 6
A/M42M-2	720	49.23	0.02	604 17	0.22	130.15	0.05	39.73	0.01	47.47	200
HLU-196	8400	415.11	≥ 1.74	223.31	0.94	8589.90	36.08	11.51	0.05	13.70	0.06
	Total		5.13		26.43		72.65		1.71		2.00
(a)		×	, , , , , , , , , , , , , , , , , , ,			X. 8.7.8	RA	, K			
A/552A-50A	19000	04:00	10.0	430.07	4.L3	268.50	2.55	31.10	0.30	46.50	0 4
MD-3/8/832A-31A	4843	25.55	0.6	436.67	0.10	268.50	0.00	31.10	0.0	46.30	5 6
TA-75 (MOGAS)	1600	122.00	0.10	146.00	0.12	3250 00	2.60	5.20	000	8.27	0.0
A/S32A-42	17000	64.60	0.55	436.67	3.71	268.50	2.28	31.10	0.26	46.50	0.40
JG-75		122.00	0.01	146.00	10.0	3250.00	0.17	5.20	0.00	8.27	0.00
A/S32A-30	2900	122.00	0.18	146.00	0.21	3250.00	4.71	5.20	0.01	8.27	0.01
Flight Line Flectric Power	Power Units							:			
NC8A (6)	12800	49.23	0.32	604.17	3.87	130.15	0.83	39.73	0.25	42.47	0.27
NC10C (6)	3500	49.23	0.09	604.17	1.06	130.15	0.23	39.73	0.07	42.47	0.07
Jet Engine Start Units	Sy								. :	:	
A/M47A-4/NCPP-105 (b)	05 (b) 37000	49.23	16.0	604.17	11.18	130.15	2.41	39.73	0.74	42.47	0.79
GTC-85 (c)		0.13	0.00	3.88	10.0	14.83	0.02	0.54	0.00	00.0	000
Miscellaneous: (b)											
A/M32C-17		49.23	0.06	604.17	0.73	130.15	0.16	39.73	0.05	42.47	0.03
A/M2/1-5 (air cond.)	1500	6074	0,00	204.17 201.7	170	130.15	0.15	39.73	0.05	42.47	0.05
HI II-196	25		S C		2 8	020000	2 .	37.73	0.03	47.41	0.0
21-011	-							121	V V	13.30	2

	-	Emissions from Ground Support Equipment at NAS Oceana	m Ground	Support Equ	ipinem at i	AS Oceana					
		20A	20	NOX	x	Σ CC	2	202	7	PM-10	10
	Fuel Consumption (gal/yr)	16/1000 gal	Total (TPY)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1997 Tow Tractors: (a)											
A/S32A-30A	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
TA-75	1200	122.00	1.04	146.00	1.25	3250.00	1.95	5.20	00.0	8.27	0.00
L L											-
Flight Line Electric Power Units				22 20 20 20 20 20 20 20 20 20 20 20 20 2							
NC8A (b)	16000	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
NC10C (b)	0009	49.23	0.15	604.17	1.81	130.15	0.39	39.73	0.12	42.47	0.13
Jet Engine Start Units											
A/M47A-4/NCPP-105 (b)	45000	49.23		604.17	13.59	130.15	2.93	39.73	0.89	42.47	96 0
GTC-85 (c)	3500	0.13	0.00	3.88	0.01	14.83	0.03	0.54	00.0	0.00	0.00
									:		
Miscellaneous: (b)											:
A/M32C-17	3000	49.23	0.07	604.17	0.91	130.15	0.20	39.73	90.0	42.47	90.0
A/M27T-5	3000	49.23	<b>0.0</b> 2	604.17	0.91	130.15	0.20	39.73	90.0	42.47	0.06
A/M42M-2	1600	49.23	0.0 40.0	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
FILU-190	7.00 Total	413.11	00.0	15.627	0,00	8589.90	0.09	11.51	0.00	13.70	0.00
	10121		4.3/		34.01	:	18.73		2.20	-	7.66
1998   Iow Iractors: (a)	00000	07 77	1.0	49264	00 F	25.07.0		1		10	
A/S32A-30	3500	00:521	17.0	146.00	4.00	2750.00	2.77 5.25	51.10	0.34	46.50	0.51
TA-35	009	64 60	000	436.67	0.13	26.00.20	0.02	31 10	10.0	15.6	0.0
A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
Flight Line Electric Power Units	Units								 :		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12000		0.00	2, 107		; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		: !(	: • • • •	:	
NC10C (6)	8000	49.23	0.20	604.17	2.42	130.15	0.52	39.73	0.32 0.16	42.47	0.34
Jet Engine Start Units									· · · · · · · · · · · · · · · · · · ·	. ,	
A/M47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.63	42.47	001
GTC-85 (c)	3500	0.13	000	3.88	10.0	14.83	0.03	0.54	0.00	0.00	0.00
Miscellaneous: (b)											
A/M32C-17	4000	49.23	010	604.17	121	130.15	0.26	39.73	0.08	42.47	0.08
A/M27T-5	4000	49.23	01.0	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
HLU-196	20	415.11	0.00	223.31	000	8589.90	0.0	11.51	0.00	13.70	000
	Total		167		43 69		44 47		22.2		

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		14. v. •	20Λ	O	XON	×	92	0	802	12	PM	PM-10
		Fuel Consumption (gal/yr)	15/1000 gal	Total (TPV)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	15/1000 gal	Total (TPY)	15/1000 gal	Total (TPY)
1999	Tow Tractors: (a)											
	A/S32A-30A (JP-5)	22400	64.60	0.72	436.67	4.89	268.50	3.01	5.20	90.0	8.27	0.09
	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
	TA-35	009	64.60	0.02	436.67	0.13	268.50	80.0	5.20	00.0	8.27	0.00
	A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	5.20	90.0	8.27	0.10
												!
	Flight Line Electric Power Unit	8								:		
	NC8A (b)	16000	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
	NC10C (6)	8000	49.23	0.20	604.17	2.42	130.15	0.52	39.73	0.16	42.47	0.17
												:
	Jet Engine Start Units											
	A/M47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	1.00
	GTC-85 (c)	3500	0.13	0.00	3.88	0.01	14.83	0.03	0.54	0.00	0.00	0.00
	Miscellaneous: (b)									:		
	A/M32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
	A/M27T-5	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
	A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
	HLU-196	20	415.11	0.00	223.31	0.00	8589.90	0.09	11.51	00.00	13.70	0.00
		Total		1 60		27 66		17.33				

# Footnotes:

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(a) Emission factors from AP-42 Volume II for gasoline-powered wheeled tractor for TA-75, JG-75, & A/S32A-30 and diesel-powered wheeled tractors for all others. (b) Emission factors from AP-42 Volume I for Uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301.. (c) Emission factor from USEPA 1992 for aircraft auxilliary power units.

Notes:
(1) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(2) Conversion from lb/MMBtu assuming heating value for JP-5 of 137,000 Btu/gallon.

Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Cont				2000	SALVO NOSSO	FOR STAGE	NGINE MAIN	TENANCE RU	N-IIPS AT NA	11414000				
Sering (1)         Timing (1)         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Timing of Facilities         Primition of Facilities         Timing of Facilities         Primition of Facilities         Timing of Facilities         Primition of Facilities         Primition of Facilities         Timing of Facilities         Timing of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of Facilities         Primition of F				EMI	SOLON KALES	(IN-FR	AME ENGINE	TESTING)		SOCEANA				
Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Control   Cont		Power Setting (1)	Time in Power Setting (1)	Fuel How (Ib/min)		E (IIb	mission Factor /1000 lb fuell/e	ng)		The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	(lb/sir	Emission Rates	1 1-un)	
150			(minutes)		VOC(2)	1-1	00	1	PM10	VOC (2)	XON	00		PM10
Total   1200   15.3   15.4   2.5   2.5   1.5   0.40   8.86   3.37   0.53   2.5   0.64     High Power	Li	Low Power				Sept. Sept. Sept.				1880				
1,200		Idle	7.00	15.3	31.42	3.22	55.51	0.40	96'8	3.37	0.35	5.96	0.04	96.0
1000   153   3142   322   3531   0.40   8.96   4.81   0.49   8.49   0.05     1000   173   3142   322   3351   0.40   2.98   4.81   0.49   8.49   0.05     1000   173   0.77   0.73   4.79   10.77   0.40   0.00   0.05   0.05     1000   173   0.77   0.20   4.79   10.77   0.40   0.00   0.05     1000   173   0.22   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   193   3.65   2.77   16.60   0.40   12.88   0.77   1.25     1000   113   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   121   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   121   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   121   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   121   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   121   46.96   1.79   0.40   0.40   0.40   0.40   0.40     1100   0.40   0.41   0.40   0.40   0.40   0.40   0.40   0.40     1100   0.41   4.70   0.40   0.40   0.40   0.40   0.40   0.40     1100   0.41   4.70   0.40   0.40   0.40   0.40   0.40   0.40     1100   0.41   4.70   0.40   0.40   0.40   0.40   0.40   0.40     1100   0.41   4.70   0.41   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40	i	%6/	12:00	71.7	1.48	10.74	3.43	0.40	5.70	1.27	9.24	2.95	0.34	4.90
High Power   1500   151   2142   2127   2131   0.40   876   4181   0.49   819   0.05		Total					1			4.65	9.59	8.91	0.39	5.87
The color   153   1344   132   1343   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349   1349		High Power												
100% Oktober   100	1	Idle	00.01	15.3	31 42	3.22	55.51	0.40	8 96	4 8	0 40	<u>8 40</u>	0.08	1.17
March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   Marc	<u>:</u>	75%	25.00	7.1.7	1.48	10.74	3.43	0.40	5.70	2.65	19.25	6.15	0.00	10.22
Columbrate   Auto   795, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   755, 7   Columbrate   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   Auto   A	!	100% (Mil)	10.00	117.5	0.77	19.60	1.38	0.40	2.98	060	23.03	1.62	0.47	3.50
Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Tota		A/B (Z5)	4.00	796.7	0.20	4.79	10.77	0.40	00.0	0.64	15.26	34.32	1.27	00.00
The color   1536		Total								9,00	\$8.04	50.58	2.52	15.09
High Power   1506   1530   0.056   1506   0.056   0.056   1506   0.056   1506   1506   0.056   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   1506   150	<u>:</u>	Low Power	90.5	10 5	375	1	16 60	07.0	17.30	26.0	1	<u>v.</u>	100	ie
High Power   15.00   19.5   15.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50   10.50	!	75%	12.50	1330	200	19 61	0.00	0.40	4 30	0.30	77'0	7971	0.04	17.1
High Power   1500   193   3.65   2.77   16.60   0.40   12.38   0.71   0.54   2.54   0.06   1.17   1.17   2.54   0.06   1.17   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.06   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   1.17   2.54   0.07   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05	<u>:</u>	Total		2	2	12.	200	2	DC.+	2 1	34.00	07.1	0.0	61.7
High Power   0.000   19.5   3.65   2.77   16.60   0.40   12.38   0.71   0.54   5.24   0.08   1.51   1.17   83.79   2.45   1.15   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   83.79   1.51   1.17   1.17   83.79   1.51   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.1	:	1 OCBI					1			0.79	32.87	2.88	0.70	8.36
High Power   10 00   19.5   3.455   2.77   16.60   0.40   12.33   0.71   0.74   3.24   0.08   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17   1.17	į	4	:				!							
High Power   1500   193   345   2.77   1650   0.40   12.38   0.511   0.545   2.77   1050   0.40   12.38   0.511   0.545   2.77   1050   0.44   0.75   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545   0.545		High Power	1											
1376   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1310   1311   1310   1310   1311   1310   1311   1310   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311   1311		de l	10.00	19.5	3.65	2.77	09'91	0.40	12.38	0.71	0.54	3.24	0.08	2.41
ABRINAL   15.00   153.5   0.44   0.45   2.81   1.17   2.85   1.17   1.17   2.46   1.17   2.45   1.17   1.17   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   1.17   2.45   2.45   1.17   2.45   2.45   1.17   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.45   2.	:	15%	20.00	133.0	0.26	19.61	0.76	0.40	4.30	0.69	52.16	2.02	1.06	11.44
Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Tota		A/B(Max)	2.00	195.3	0.40	28.63	0.84	0.40	2.81	21:1	83.87	2.46	1.17	8.23
Low Power   15.00   11.3   48.96   1.79   6.3.78   0.40   0.00   8.32   0.30   1.1144   0.07   0.25     Ide   15.00   11.3   48.96   1.79   5.3.78   0.40   0.00   0.48   7.27   2.16   0.25     Total   Ide   15.00   11.3   48.96   1.79   3.00   0.40   0.00   0.48   7.27   2.16   0.25     High Fower   15.00   11.3   48.96   1.79   3.00   0.40   0.00   0.24   0.36   0.13   0.05     High Fower   15.00   122.8   0.93   13.05   0.71   0.40   0.00   0.24   0.75   0.70   0.35     High Fower   15.00   10.4   38.18   1.16   1.75   0.40   0.12   8.75   0.15   0.40   0.15     High Fower   13.00   10.4   38.18   1.16   1.75   0.40   0.10   0.13   5.65   0.42   0.15     High Fower   13.00   10.4   38.18   1.16   1.75   0.40   0.40   0.12   8.75   0.15   0.15     High Fower   13.00   10.4   38.18   1.16   1.75   0.40   0.40   0.12   8.75   0.15   0.15     High Fower   13.00   10.4   38.18   1.16   1.75   0.40   1.238   7.87   0.16   0.15     High Fower   13.00   10.4   38.18   1.16   1.75   0.40   1.238   7.87   0.16     High Fower   13.00   1.43.1   0.31   2.516   0.30   0.15   0.35   0.35    A.B   2.00   4.77.3   0.13   2.516   0.60   0.12   8.75   0.18   0.18    A.B   2.00   4.77.3   0.13   2.516   0.60   0.12   8.75   0.18   0.18    A.B   2.00   4.77.3   0.13   2.516   0.60   0.12   8.75   0.18   0.18    A.B   2.00   4.77.3   0.13   0.22   2.517   0.60   0.12   8.75   0.18   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.10   0.12   0.15   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.10   0.12   0.18   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.10   0.12   0.15   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.10   0.12   0.15   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.12   0.15   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.10   0.12   0.18    A.B   2.00   4.77.3   0.13   0.13   0.13   0.13   0.15   0.15    A.B   2.00   2.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    A.B   2.00   2.00   2.00   0.00   0.00   0.00   0.00   0.00	_	Total	20'+	0.047	Cra	2,26	77.67	0.40	0.00	7 2	34.83	8/39	15.1	000
High Power   15.00   11.3   48.96   1.79   6.378   0.40   0.00   8.23   0.30   10.84   0.07     Total   15.00   12.0   0.67   10.10   3.00   0.40   0.00   0.48   7.27   2.16   0.25     High Power   13.00   10.4   38.18   1.16   137.34   0.40   12.38   3.59   0.08   0.30     High Power   13.00   10.4   38.18   1.16   137.34   0.40   12.38   7.87   0.16   0.18     High Power   13.00   10.4   38.18   1.16   137.34   0.40   12.38   7.87   0.16   0.18     High Power   13.00   10.4   38.18   1.16   137.34   0.40   12.38   7.87   0.16   0.18     High Power   13.00   10.4   38.18   1.16   137.34   0.40   12.38   7.87   0.16   0.18     High Power   13.00   10.4   38.18   1.16   1.09   0.40   4.00   0.22   13.71   0.10   0.37     High Power   13.00   10.4   38.18   1.16   1.05   0.40   2.21   18.00     Wh Standard   13.00   14.13   14.80   1.05   0.40   0.12   8.73   1.18   0.15      Wh Standard   13.00   14.13   1.25   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13	+	Low Power					1			3.0,	2	11.6%	3.83	22.08
13.00   72.0   0.67   10.10   3.00   0.40   0.00   0.48   77.2   2.16   0.29     15.00   11.3   48.96   1.79   63.78   0.40   0.00   8.30   0.30   10.81   0.07     15.00   11.3   48.96   1.79   63.78   0.40   0.00   0.24   3.64   1.08   0.14     15.00   12.8   0.67   10.10   0.71   0.40   0.00   0.24   3.64   1.08   0.15     15.00   10.4   58.18   1.16   1.09   0.40   0.13   3.93   0.08   9.28   0.03     13.00   10.4   58.18   1.16   137.34   0.40   0.12   8.57   0.15     13.00   10.4   58.18   1.16   1.05   0.40   0.40   0.32   13.71   1.01     13.00   10.4   58.18   1.16   1.05   0.40   0.40   0.32   13.71   1.01     13.00   14.31   0.31   25.16   1.05   0.40   0.40   0.12   8.73   21.89   0.38     2.00   4.13   0.13   25.16   1.05   0.40   0.00   0.12   8.73   21.89   0.38     2.189   0.35   0.35   0.35   0.35   0.35   0.35     2.189   0.35   0.35   0.35   0.35   0.35   0.35     2.189   0.35   0.35   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35     2.180   0.31   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.35   0.35   0.35     2.180   0.	1	ldle	13.00	11.3	48.96	1.79	63.78	0.40	0.00	8 32	0.00	10.84	0.07	00.0
13.00	!	78-82%	10.00	72.0	0.67	10.10	3.00	0.40	00.0	0.48	7.27	2.16	0.29	00.0
High Power         13.00         II.3         48.96         1.79         63.78         0.40         0.00         8.30         0.30         10.81         0.07           Idle         13.00         122.8         0.93         13.05         0.71         0.40         0.00         0.24         3.56         0.70         0.39           76.8 22%         5.00         72.0         0.67         10.10         3.00         0.40         0.00         0.24         0.70         0.34           94-100%         8.00         122.8         0.94         0.70         0.94         0.70         0.70         0.39         0.70         0.39           Ide         6.50         10.4         38.18         1.16         1.74         0.40         6.10         0.13         3.65         0.20           Total         109.0         0.35         14.80         1.09         0.40         6.10         0.13         3.56         0.15         9.70         0.18           High Power         13.00         10.4         12.38         7.87         0.16         9.70         0.18           High Power         13.00         10.4         12.38         7.87         0.16         9.70         0		Total								8.80	7.58	13.00	0.36	0.00
15.00   11.3   48.96   1.79   63.78   0.40   0.000   8.30   0.30   10.81   0.07     5.00   72.0   0.67   10.10   3.00   0.40   0.00   0.024   3.64   1.08   0.14     6.50   10.4   58.18   1.16   1.734   0.40   12.38   3.93   0.08   0.42     13.00   10.4   58.18   1.16   137.34   0.40   12.38   7.87   0.16   1.01     13.00   10.4   58.18   1.16   137.34   0.40   12.38   7.87   0.16   1.01     13.00   143.1   0.35   14.80   1.05   0.40   0.40   0.32   13.71   1.01     2.00   473.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     2.00   473.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     3.00   473.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     3.00   4.73.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     3.00   4.73.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     3.00   4.73.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189     3.00   4.73.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   2.189   0.38     3.00   4.73.3   0.13   0.13   0.10   0.10   0.10   0.10     3.00   4.73.3   0.13   0.13   0.10   0.10   0.10   0.10     3.00   4.73.3   0.13   0.13   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10   0.10   0.10   0.10     3.00   0.10	-				3.5.2	Francisco (September 1988)							. :	
78.82%         5.00         72.0         0.67         10.10         3.00         0.71         0.40         0.20         0.24         3.64         10.81         0.01           Fotal         E. 87         8.00         12.28         0.63         13.05         0.71         0.40         0.00         0.91         12.82         0.70         0.01           Low Power         6.50         10.4         38.18         1.16         137.34         0.40         12.38         3.93         0.03         0.13           Idle         6.50         10.4         38.18         1.16         137.34         0.40         6.10         0.13         3.53         0.03         0.13           Total         13.00         10.4         38.18         1.16         137.34         0.40         6.10         4.07         5.72         9.70         0.18           High Power         13.00         10.4         12.38         7.87         0.16         0.18           76%         8.50         10.4         12.38         7.87         0.16         0.18           1RP         5.00         143.1         0.31         25.16         1.05         0.40         0.40         0.12         1.80 <td></td> <td>Tigh rower</td> <td>15.00</td> <td></td> <td>48.02</td> <td>1 40</td> <td>22.12</td> <td>0.40</td> <td>70.00</td> <td>8.3%</td> <td>Ye V</td> <td>i o XI</td> <td>10</td> <td>100</td>		Tigh rower	15.00		48.02	1 40	22.12	0.40	70.00	8.3%	Ye V	i o XI	10	100
94-100%         8 00         1228         0.93         13.60         0.71         0.40         0.00         0.91         12.82         0.70         0.39           Low Power         6 50         10 4         38.18         1.16         137.34         0.40         12.38         3.93         0.03         0.13           Total         6 50         10 4         38.18         1.16         1.09         0.40         6.10         0.13         5.65         0.28         0.03           Total         13 00         10 4         38.18         1.16         137.34         0.40         6.10         4.07         5.72         9.70         0.18           High Power         13 00         10 4         38.18         1.16         137.34         0.40         12.38         7.87         0.16         1.01         0.18           76%         8.50         10 4         38.18         1.16         137.34         0.40         4.00         6.22         18.00         0.05           76%         8.50         1030         0.35         14.80         1.09         0.40         4.00         0.32         1.01         0.15         0.25           76%         3.00         4.01 <td>-</td> <td>78.87%</td> <td>\$ 00</td> <td>72.0</td> <td></td> <td>10.17</td> <td>3.78</td> <td>0.40</td> <td>0.00</td> <td>0.30</td> <td>2.64</td> <td>100</td> <td>/00</td> <td>8 9</td>	-	78.87%	\$ 00	72.0		10.17	3.78	0.40	0.00	0.30	2.64	100	/00	8 9
Total         550         10.4         38.18         1.16         137.34         0.40         12.38         3.93         0.08         9.22         0.60           Idle         6.50         10.4         38.18         1.16         1.09         0.40         6.10         0.13         5.65         0.42         0.15           Total         3.50         10.4         38.18         1.16         137.34         0.40         12.38         7.87         0.16         0.18           High Power         13.00         10.4         38.18         1.16         137.34         0.40         12.38         7.87         0.16         18.57         0.05           76%         8.50         109.0         0.33         1.480         1.05         0.40         1.238         7.87         0.16         1.01         0.37           76%         8.50         109.0         0.35         1.480         1.05         0.40         2.81         0.22         1.37         0.05           A/B         5.00         4.73.3         0.13         9.22         2.31         0.40         0.12         8.73         2.189         0.36           A/B         2.00         4.00         0.22		94-100%	800	122.8	]."	13.05	0.71	0.40	00.0	100	20.61	0.70	20.0	0.00
Low Power         6 50         104         38.18         1.16         137.34         0.40         12.38         3.93         0.08         9.28         0.03           Total         6 50         109.0         0.35         14.80         1.09         0.40         6 10         0.13         5.65         0.15         0.15         0.15           Total         1300         104         38.18         1.16         137.34         0.40         12.38         7.87         0.16         18.57         0.05           76%         8.50         109.0         0.35         14.80         1.05         0.40         1.238         7.87         0.16         18.57         0.05           76%         8.50         103.0         0.35         1.480         1.05         0.40         2.81         0.22         18.00         0.75         0.29           A/B         2.00         4.03         0.22         18.00         0.75         0.25         0.75         0.29           A/B         2.00         4.73.3         0.13         9.22         2.31         0.40         0.12         8.73         2.189         0.38		Total		1					:	9,45	16.76	12.59	0.60	0.00
650         104         58.18         1.16         137.34         0.40         12.38         3.95         0.08         9.28         0.03           3.50         1090         0.35         14.80         109         0.40         6.10         0.13         56.55         0.42         0.15           13.00         10.4         58.18         1.16         137.34         0.40         12.38         7.87         0.16         18.57         0.05           8.50         143.1         0.35         14.80         1.09         0.40         4.00         0.32         13.71         1.01         0.37           2.00         4.73.3         0.13         9.22         23.12         0.40         0.00         0.12         8.73         21.89         0.38		Low Power	:				:		:					
3.50         1090         0.35         14.80         1.09         0.40         6.10         0.13         5.72         0.42         0.15           13.00         10.4         58.18         1.16         137.34         0.40         12.38         7.87         0.16         18.57         0.05           8.50         109.0         0.35         14.80         1.09         0.40         4.00         0.32         137.1         1.01         0.37           2.00         473.3         0.13         9.22         23.12         0.40         0.10         8.73         21.89         0.38		idle	9 9	10.4	58.18	1.16	137.34	0.40	12.38	3.93	80.0	9.28	0.03	0.84
13.00   10.4   58.18   1,16   137.34   0.40   12.38   7.87   0,16   1.01   0.37   0.05     8.50   109.0   0.35   14.80   1.09   0.40   4.00   0.32   13.71   1.01   0.37     5.00   143.1   0.31   25.16   1.05   0.40   0.00   0.12   18.00   0.75   0.29     2.00   473.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   21.89   0.38     2.189   0.38   0.38   0.38   0.38     3.00   3.00   3.00   0.00   0.00   0.00     3.00   3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0.00     3.00   3.00   0		%92	3.50		0.35	14.80	60	0.40	6.10	0.13	5,65	0.42	0.15	2.33
13.00         10.4         58.18         1,16         137.34         0.40         12.38         7.87         0,16         18.57         0.05           8.50         109.0         0.35         14.80         1.09         0.40         4.00         0.32         13.71         1.01         0.37           5.00         143.1         0.31         23.16         1.05         0.40         2.81         0.22         18.00         0.75         0.29           2.00         473.3         0.13         9.22         23.12         0.40         0.00         0.12         8.73         21.89         0.38		Total								4.07	5.72	9.70	0.18	3.16
13.00         10.4         58.18         1,16         13.73         0.40         12.38         7.87         0,16         18.57         0.05           8.50         109.0         0.35         14.80         1.09         0.40         4.00         0.32         13.71         1.01         0.37           5.00         143.1         0.31         23.16         1.05         0.40         2.81         0.22         18.00         0.75         0.29           2.00         473.3         0.13         9.22         23.12         0.40         0.00         0.12         8.73         21.89         0.38	٠.		:						:					
13.00   10.4   58.18   1.16   137.34   0.40   12.38   7.87   0.16   18.57   0.05     8.50   109.0   0.35   14.80   1.09   0.40   4.00   0.32   13.71   1.01   0.37     5.00   143.1   0.31   25.16   1.05   0.40   2.81   0.22   18.00   0.75   0.29     2.00   4.73.3   0.13   9.22   23.12   0.40   0.00   0.12   8.73   21.89   0.38		High Power						:						
8.50         109.0         0.35         14.80         1.09         0.40         4.00         6.32         13.71         1.01         0.37           5.00         143.1         0.31         25.16         1.05         0.40         2.81         0.22         18.00         0.75         0.29           2.00         473.3         0.13         9.22         23.12         0.40         0.00         0.12         8.73         21.89         0.38		Idle	13.00	10.4	58.18	91'1	137.34	0.40	12.38	7.87	0.16	18.57	0.05	i.67
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		76%	80.50	0.601	0.35	14.80	1.09	0.40	4.00	0.32	13.71	101	0.37	3.71
2.00 4733 0.13 9.22 23.12 0.40 0.00 0.12 8.73 21.89 0.38		<b>3</b>	2.00	143.1	0.31	25.16	1.05	0.40	2.81	0.22	18.00	0.75	0.29	2.01
		ΑB	2.00	473.3	0.13	9.22	23.12	0.40	0.00	0.12	8.73	21.89	0.38	0.00

Notes:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Volume 2. Power setting and time in power setting for F-14 A, F-14B/D, F/A-18 aircraft, and A-6 provided by AESO and COMNAVAIRLANT.

(2) Aircraft VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

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(3) Shaded areas indicate organic compounds

(3) Shaded areas indicate organic compounds

(3) Shaded areas indicate organic compounds

(3) Shaded areas indicate organic compounds

(4) Shaded areas indicate organic compounds

(5) Shaded areas indicate organic compounds

(6) Shaded areas indicate organic compounds

(7) Shaded areas indicate organic compounds

(8) Shaded areas indicate organic compounds

(9) Shaded areas indicate organic compounds

(9) Shaded areas indicate organic compounds

(10) Shaded areas indicate organic compounds

(11) Shaded areas indicate organic compounds

(12) Shaded areas indicate organic compounds

(13) Shaded areas indicate organic compounds

(14) Shaded areas indicate organic compounds

(15) Shaded areas indicate organic compounds

(16) Shaded areas indicate organic compounds

(17) Shaded areas indicate organic compounds

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			EMISSIO	EMISSIONS FROM SING		ARS 2 IE IN-FRAME MAINTEN	AINTENANCE	LE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA	AS OCEANA				
	Type of	Run-up mode	Number of	20A	(3)	N SON SON I	NOX	00		202		PMI	10
	Aircraft (Engine) and		Single Engine	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	
1661	F-14A (TF30-P-412A)	Low Power	9.617	4.65	22.34	9.59		8.91	42.83	0.39	1.86	5.87	4
:	80	High Power	274	9.00	123	58.04	7.94	50.58	6.92	2.52	0.35	15.09	
													:
	F-14B/D (F110-GE-400)	Low Power	3,365	62.0	1,33	32.87	55.30	2.88	4.85	0.70	1.18	8.36	
	. 55	High Power	176	3.07	0.27	171.43	15.11	95.11	8.38	3.83	0.34	22.08	
	A-6 (J-52-P-8B)	Low Power	10,320	8.80	45.42	7.58	39.09	13.00	80.79	0.36	1.84	00.0	
	98	High Power	292	9.45	1.38	16.76	2.45	12.59	1.84	09:0	0.09	00.00	;
				Total	71.97		165.99		131.90		5.65		
		, , , , , , , , , , , , , , , , , , ,											
966	F-14A (TF30-P-412A)	Low Power	11,180	4.65	25.96	9.59	46.09	8.91	42.83	0.39	1.86	5.87	
	. 93	High Power	318	00'6	1.43	58.04	7.94	50.58	6.92	2.52	0.35	15.09	:
	F-14B/D (F110-GE-400)	Low Power	4,221	0.79	1.66	32.87	55.30	2.88	4.85	0.70	1.18	8.36	ī
	69	High Power	221	3.07	0.34	171.43	15.11	95.11	8.38	3.83	0.34	22.08	
	A-6 (J-52-P-8B)	Low Power	1,680	0.13	0.11	5.65	4.74	0.42	0.35	0.15	0.13	2.33	
	14	High Power	48	0.22	0.01	18.00	0.43	0.75	0.02	0.29	0.01	2.01	
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	0.97	0.18	0.02	3.16	
	12	High Power	46	8.54	0.21	40.60	0.99	42.21	1.03	1.09	0.03	7.39	
; ;				Total	30.13		131.19		65.36		3.91		
1001	E_144 (TE30-P_417A)	I ow Power	11 420	4.65	26.52	9 59	54.74	16.8	50.86	.1 0.39	221	5.87	
	95	High Power	325	9.00	1.46	58.04	9.43	50.58	8.22	2.52	0.41	15.09	
		)					200				:		
	F-14B/D (F110-GE-400)	Low Power	6,302	0.79	2.48	32.87	103.57	2.88	80.6	0.70	2.22	8.36	
	103	High Power	330	3.07	0.51	171.43	28.30	95.11	15.70	3.83	0.63	22.08	
			di di	33						 	10		
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	0.97	0.18	0.02	3.16	
	12	High Power	49	8.54	0.21	40.60	660	42.21	1.03	1.09	0.03	7.39	
					**************************************	27 L	CONT. ( SEC. ) 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	_				_	

						ARS 2							
			EMISSIO	EMISSIONS FROM SING	LE ENGINE FC	VE IN-FRAME MAINTEN FOR 1993 AND 1996-1999	4INTENANCE 196-1999	LE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	NAS OCEAN.	₹			
	Type of	Run-up mode	1	AOC	6	NOX	<b>X</b> 0	03	<b></b>	802	2	PM10	0
	Aircraft (Engine) and Number of Aircraft		Single Engine Run-ups/yr	Single Engine Lb per Single Run-ups/yr Engine Run-up	Total (TPY)	Lb per Single Engine Run-up	Total (TPX)	Lb per Single Engine Run-up	Total (TPY)	Lb per Single Engine Run-up	Total (TPV)	Lb per Single Engine Run-un	Total
										or end of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the se	T. T. T. T. T. T. T. T. T. T. T. T. T. T	0	
8661	F-14A (TF30-P-412A)	Low Power	6,010	4.65	13.96	6.59	28.81	16.8	75.77	0.39	0.00	5.87	17.63
	20	High Power	171	00.6	0.77	58.04	4,96	50.58	4.32	2.52	00.00	15.09	1.29
	F-14B/D (F110-GE-400)	Low Power	5,936	0.79	2.34	32.87	97.56	2.88	8.55	0.70	2.09	8.36	24.80
	64	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09.0	22.08	3.44
	E/A 18 75404 OF 4001	-	3//6	100									
	F/A-18 (F404-GE-400)	Low Power	200,/	4.07	15.59	5.72	21.94	9.70	37.18	0.18	69.0	3.16	12.13
	132	High Power	460	8.54	1.96	40.60	9.35	42.21	9.72	60.1	0.25	7.39	1.70
				Total	35.10		189.31		101.35		3.63		86.09
22.5										1	:		:
1999	F-14A (TF30-P-412A)	Low Power	6,010	4.65	13,96	9.59	28.81	8.91	26.77	0.39	1.16	5.87	17.63
	20	High Power	171	9.00	0.77	58.04	4.96	50.58	4.32	2.52	0.22	15.09	1.29
	F-14B/D (F110-GE-400)	_	5,936	0.79,	2.34	32.87	97.56	2.88	8.55	0.70	2.09	8.36	24.80
	64	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09.0	22.08	3.44
	E/A.18 (F404-GF-400)	I ow Power	0 756	407	<b>10 01</b>	•	37.03	jo jo	75.57	io.	10	P	# ** **
	(001-70-101) 01-11/1	LOW LOWE	0,,,	4.0.1	17.04	2.76	76.17	9.70	41.32	0.18	0.88	3.16	15.43
	891	High Power	586	8.54	2.50	40.60	11.90	42.21	12.37	1.09	0.32	7.39	2.17
				20	30.00		F0.401		1111				200

(1) Number of maintenance run-ups for F-14A, F-14B/D, and FA-18 aircraft in 1997 and 1999 are from Wyle (1997). 1995, and 1998 maintenance run-ups were scaled from 1997 based on number of aircraft stationed at NAS Ocea (2) Maintenance run-ups for A-6 based on actual 1993 data. 1996 data scaled using 1993 data. (3) Aircraft VOC reported as HC in the form CHy/x (3) Aircraft VOC reported as HC in the form CHy/x (4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:

								Table F-8							
						STATION	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 2 FOR 1993 AND 1996-1999	RCE EMISSIONS AT NA FOR 1993 AND 1996-1999	T NAS OCEAN	A - ARS 2					
Source			1993					9661					1997		
Type	MOC	NOx	22	202	PM10	VOC	NOx	20	SOZ	PM10	200	NOx	2	202	PM10
Stationary Sources:												1300			
Boilers	<b>:</b>	32.32	8.31	22.09	3.84	0.78	29.13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	3.63
Generators	17.0	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	19.0	2.11	27.87	7.27	3.77	2.21
Engine Testing	3.26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	10.1	2.78	3.75	29.99	39.88	1.25	3.71
						は多数にてい									
JP-5 Fuel Handling	99'0	000	0.00	00.0	0.00	0.46	0.00	00.00	00:0	00.0	0.54	0.00	0.00	00.0	00.0
Service Station	19.35	000	0.00	00.0	00.0	4.46	0.00	0.00	00.0	00.0	4.67	0.00	0.00	0.00	00.0
Painting	19.30	00'0	00.0	00:0	00:00	13.29	00.0	00.00	00.00	00.0	14.00	0.00	0.00	0.00	0.00
							X 3				500 100 100 100 100 100 100 100 100 100				
Construction:	00'0	00.0	00.0	00.0	00:00	00.0	0.00	0.00	00.00	00.00	00.0	0.00	0.00	0.00	00.0
							W. 1964				(1)		. !	. !	
Total	44.41	60.88	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
			1 1 2 2 3		1										

					Tab	Table F-8			7	
			ST	ATIONARY SC	FOR 1993 A	RCE EMISSIONS AT NAS FOR 1993 AND 1996-1999	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 2 FOR 1993 AND 1996-1999	7		
Source			8661					1999	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	
Type	NOC.	NOx	83	202	PM10	ZOA NOC	NOX	00	<u>SO2</u>	PM10
Stationary Sources:							7 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10 (A. 10			
Boilers	0.62	27.13	89.9	22.82	3.38	0.62	27,13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	211	27.87	7.27	3.77	2.21
Engine Testing	9.71	54.07	90.79	1.81	9.73	11.05	58.01	71.61	1.92	11.11
JP-5 Fuel Handling	0.81	0.00	0.00	0.00	0.00	06'0	0.00	0.00	00.00	00.00
Service Station	6.40	0.00	0.00	0.00	0.00	6.72	000	0.00	0.00	0.00
										:
Painting	34.12	0:00	0.00	0.00	00.00	41.00	0.00	00.0	0.00	0.00
									•	
Construction:	0.00	0.00	0.00	0.00	0.00	2.55	26.13	8.18	2.41	4.04
									1	
Total	53.77	109.07	81.01	28.40	15.32	64.96	139.15	93.75	30.92	20.74
		Andready targetion by property property of the foreign designation of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of 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Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds

Key:

NOx = oxides of nitrogen

CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

				THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND THE PERSON NAMED IN COLUMN 2 AND		T	Table F-9							:
				EMISSION R		TES FOR AIRCRAFT ENGINE TESTS AT NAS OCEANA - ARS 2 (SINGLE ENGINE IN TEST CELLS)	ENGINE TEST NE IN TEST C	IS AT NAS OC.	EANA - ARS 2					
Engine	Power	Time in Power	Fuel Flow	Calculated Fuel		Em	Emission Factor (3)	3)			Single I	Single Engine Test Emissions (nounds)	issions	
(imposite)	9	(minutes)	(	(gallons/test)	VOC (4)	1 1	00	IJ	PM10	(4)	NOX	2	202	PM10
TF30-P-412A	Idle	28.00	15.33	63.12	31.42	3.22	55.51	0.54	8.96	13.49	1.38	23.83	0.23	3.85
(F-14A)	75%	5.00	71.67	52.70	1.48	10.74	3.43	0.54	7.98	0.53	3.85	1.23	0.19	2.86
·	81%	23.00	77.40	261.79	1.20	16.02	1.62	0.54	7.98	2.14	28.52	2.88	96'0	14.21
	A/B	22.00	196.67	2577.46	0.20	4.79	10.77	0.54	00.00	3.51	83.95	188.76	9.46	0.00
*	Total	78.00		2955.08					Per Test	19.66	117.70	216.70	10.85	20.91
F110-GF-400	Idle	54.00	19.50	154.85	3.97	2.74	15.75	0.54	12.38	4.18	2.89	16.58	0.57	13.04
(F-14B/D)	81%	44.00	143.70	929.82	0.26	19,61	0.76	0.54	2.81	1.64	123.99	4.81	3.41	17.71
٠ ١	63%	25.00	198.22	728.75	0.31	28.53	1.08	0.54	2.81	1.54	141.38	5.35	2.68	13.92
•	A/B	11.00	945.05	1528.76	3.75	12.64	44.21	0.54	00.0	38.98	131.40	459.59	5.61	0.00
	Total	134.00		3342.18					Per Test	46.34	399.66	486.33	12.27	44.73
J-52-P-8B	Ground Idle	32.00	11.33	53.32	48.96	1.79	63.78	0.54	00'0	17.75	0.65	23.12	0.20	0.00
(9-V)	RP	18.00	122.83	325.14	1.08	13.05	0.71	0.54	0.00	2.39	28.85	1.57	1.19	0.00
	75% Thrust	24.00	72.00	254.12	0.87	10.10	3.00	0.54	0.00	05.1	17.45	5.18	0.93	00.0
	3k Lbs Thrust	<u> </u>	38.33	140.92	1.99	6.34	10.54	0.54	0.00	161	6.08	10.10	0.52	0.00
•	Total	! !		773.49					Per Test	23.55	53.03	39.98	2.84	9.0
		! !												
F404-GE-400	Idle	52.00	10.40	79.53	58.18	1.16	137.34	0.40	12.38	31.46	0,63	74.27	0.22	6.70
(F/A-18)	%08	34.00	131.60	658.00	0.33	18.71	1.17	0.40	6.10	1.48	83.72	5.24	1.79	27.29
	A/B	3.00	473.28	208.80	0.13	9.22	23.12	0.40	00:00	0.18	13,09	32.83	0.57	0.00
•	Total	00 68		946.33	大学的 に存せる				Per Test	33.12	97.43	112.34	2.57	33.99

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SOZ = sulfur dioxide PM10 = particulate matter Key:

A/B Max. = maximum afterburner IRP = intermediate rated power (same as military) 75% = 75% throttle setting

# EMISSIONS FROM AIRCRAFT ENGINE TESTING AT NAS OCEANA - ARS 2 FOR 1993 AND 1996-1999 Table F-10

	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s				(SING)	SINGLE ENGINE IN TEST CEI	TEST CELLS)						
Year	Engine	Number of	Number of	VOC.	(2)	Ž	NOT		93	S	S02	PN	PM10
	Model	Aircraft	Tests/Year	per test	Total	per test	Total	i		!	ı		Total
			(1)	<b>(A)</b>	(TPX)	(ib)	(TEV)	(lb)	(TPY)	(gp)	(TPY)	(B)	(TPY)
1993	TF30-P-412A	80		19.66	0.76	117.70	4.56	216.70	8.39	10.85	0.42	20.91	0.81
	F110-GE-400	55	99	46.34	1.52	399.66	13.12	486.33	15.97	12.27	0.40	44.73	1.47
	J-52-P-8B	98	83	23.55	0.98	53.03	2.21	39.98	1.66	2.84	0.12	0.00	0.00
				Total	3.26		19.89		26.03		0.94		2.28
												1	
1996	TF30-P-412A	93	8	99:61	0.89	117.70	5.30	216.70	97.6	10.85	0.49	20.91	0.94
	F110-GE-400	69	82	46.34	191	399.66	16.47	486.33	20.04	12.27	0.51	44.73	1.84
	F404-GE-400 (4)	12	0	33.12	00.0	97.43	00'0	112.34	0.00	2.57	0.00	33.99	0.00
	J-52-P-8B	14	14	23.55	0.16	53.03	0.36	39.98	0.27	2.84	0.02	0.00	00.0
				Total	2.95		22.13		30.07		1.01	1	2.78
	:												
1997	TF30-P-412A	95	92	99.61	06'0	117,70	5.41	216.70	9.97	10.85	0.50	20.91	0.96
	F110-GE-400	103	123	46.34	2.85	399.66	24.58	486.33	29.91	12.27	0.75	44.73	2.75
	F404-GE-400 (4)	12	0	33.12	000	97.43	0.00	112.34	00'0	2.57	0.00	0.00	0.00
-				Total	3.75		29.99		39.88		1.25		3.71
	;											:	
1998	TF30-P-412A	20	09	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	132	299	33.12	4.95	97.43	14.57	112.34	16.79	2.57	0.38	33.99	5.08
				Total	9.71		54.07		90.79		1.81	:	9.73
:													
1999	TF30-P-412A	50	99	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	76	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	891	380	33.12	6.29	97.43	18.51	112.34	21.34	2.57	0.49	33.99	6.46
_				Total	11.05		58.01		71.61		1.92		11.11

(1) Number of engine tests per F-14A, F-14B/D, and F/A-18 aircraft from U.S. Navy (1997) and Wyle (1997). Number of A-6 engine tests per aircraft assumed to be the same as F-14A engine tests per aircraft.
(2) Aircraft engine emissions of VOC reported as HC in the form CHy/x.
(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(4) Adversary squadron engine tests not conducted at Oceana due to lack of F404 test equipment.

(5) Includes adversary squadron test cell events due to installation of F404 test equipment at NAS Oceana. Key:

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

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PARKING LOT CONSTRUCTION (4 LOTS) AND AIRCRAFT APRON - ARS 2 Equipment Exhaust Emissions Table F-11

	Equipment	Days		Emission F	Emission Factors (1b/1000 gal)	0 gal)			EMIS	EMISSIONS (Ibs)		
Equipment List	quantity	Osed	NO	VOC	93	802	PM10	NOX	VOC	8	802	PM10
Crane	0	0	403	35.0	82.0	31.2	27	0.0	0.0	0.0	0.0	0.0
Backhoe Loader	2	09	395	39.0	133.0	31.2	27	2370.0	234.0	798.0	187.2	162.0
Pan Scraper	1	20	340	9.61	7.76	31.2	27	>340.0	19.6	7.76	31.2	27.0
Hi-Lift	0	0	364	31.0	121.0	31.2	25	0.0	0.0	0.0	0.0	0.0
Front-end Loader, wheels	-	09	403	23.5	94.0	31.2	29	1209.0	70.5	282.0	93.6	87.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Track loader	-	0	391	23.5	94.0	31.2	24	. 0.0	0.0	0.0	0.0	0.0
Grader	2	09	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	132.0
Bulldozer	2	09	375	43.0	74.3	31.2	25	2250.0	258.0	445.8	187.2	150.0
Compactor	3	09	364	31.0	121.0	31.2	24	3276.0	279.0	1089.0	280.8	216.0
Roller	3	09	364	31.0	121.0	31.2	24	3276.0	279.0	1089.0	280.8	216.0
Paver	-	09	403	23.5	125.0	31.2	29	1209.0	70.5	375.0	93.6	87.0
							: : !					_
haul trk/cement mixer, mob(gm/	4	09	8.0	2,1	9.93	2.8	2.15	422.9	111.0	524.9	148.0	113.7
haul trk/cement mixer, idl(gm/hr	4	09	13.2	16.2	40.2	0	0	14.0		42.5	0.0	0.0
							Total, lb/yr	16616.9	1596.7	5189.7	1489.6	1190.7
							Total TPY	8.31	0.80	2.59	0.74	09'0
							A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR					

F-25

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

NEW BUILDING/ADDITION CONSTRUCTION - ARS 2 **Equipment Exhaust Emissions** Table F-11

	Equipment	Days		Emission Fa	Emission Factors (lb/1000 gal)	gal)			EMIS	EMISSIONS (Ibs)		
EQUIPMENT LIST	quantity	Used	NOx	voc	00	802	PM10	NOX	NOC.	00	802	PM10
Crane	3	120	403	35.0	82.0	31.2	27	7254.0	630.0	1476.0	561.6	486.0
Backhoe Loader	2	120	395	39.0	133.0	31.2	27	4740.0	468.0	1596.0	374.4	324.0
Pan Scraper		120	340	19.6	7.76	31.2	27	2040.0	117.6	586.2	187.2	162.0
Hi-Lift	4	120	364	31.0	121.0	31.2	25	8736.0	744.0	2904.0	748.8	0.009
Front-end Loader, wheels	-	120	403	23.5	94.0	31.2	29	2418.0	141.0	564.0	187.2	174.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0'0	0.0	0.0	0.0	0.0
Track loader	0	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Grader	-	120	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	132.0
Bulldozer	2	120	375	43.0	74.3	31.2	25	4500.0	516.0	891.6	374.4	300.0
Compactor	-	120	364	31.0	121.0	31.2	24	2184.0	186.0	726.0	187.2	144.0
Roller	0	0	364	31.0	121.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Paver	0	0	403	23.5	125.0	31.2	29	0.0	0.0	0.0	0.0	0.0
												<u> </u>
haul trk, mob(gm/mi)	7	120	8.0	2.1	9.93	2.8	2.15	1480,2	388.5	1837.3	518.1	397.8
haul trk, idl(gm/hr)	7	120	13.2	16.2	40.2	0	0	48.8	59.9	148.8	0.0	0.0
							Total Lb/yr	35651.0	3509.1	11175.6	3326.1	2719.8
							Total TPY	17.83	1.75	5.59	1.66	1.36

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

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# ANNUAL DEMOLITION PARTICULATE EMISSIONS - ARS 2 Table F-12

Space (FT) RE						
REMOVAL (LBS) REMOVAL (LBS)         ACTIVITY (LBS)           10.0         184.3         2087.5	Floor Space	STRUCTURE	DEBRIS	VEHICLE	EMISSIC	NOS SUM
10.0 184.3 2087.5	(SQ FT)	REMOVAL (LBS)	REMOVAL (LBS)	ACTIVITY (LBS)	LBS/YR	TPY
	196,102	10.0	184.3		2281.8	1.14

Notes:

Demolition square ft assumed = 10 % of new construction sq ft PM emission from structure takedown based on sq ft \*EF

PM emission from on-site vehicle activity based on sq ft \*EF PM emission from debris removal based on sq ft \*EF

Pushing (bulldozing) PM emission put under site prep spreadsheet

Reference EPA-450/2-92-004 (Fugitive Dust document) (all EF's in EPA document converted to english units)

Table F-12	ANNUAL SITE PREPARATION PARTICULATE EMISSIONS FOR CONSTRUCTION AT NAS OCEANA - ARS

ACRES	ACTIVITY	ACTIVITY BULLDOZIN	PAN SCRAPING	PAN SCRAPING	EMISSIONS SUM	<b>EMISSIONS SUM</b>	
	DAYS	(LBS)	SOIL REMOV(LBS)	SOIL REMOV(LBS) ETHMOVING (LBS)		TPY	
45			720	454	1894	0.95	

Notes:

Acreage estimate based on building sq ft\*2

Estimate activity days for preferred, develop ratio days:acres

Apply ratio to ARS acreages to get activity days

Bulldozing pm emissions based on 8hr/activity day \* EF (EPA 1992) Soil removal emiss based on VMT/acre \*acres\*EF (EPA 1992)

Earthmoving emiss based on soil removal miles \*3 (BEE)\*EF

EPA 1992 is Fugitive Dust BG document (EPA-450/2-92-004)

	Table F-13		Milliands designation of the second	
Total Co.	Total Construction Emissions (Exhaust and Dust) - ARS 2	ust) - ARS 2		
Project/Source	Emiss	Emissions (tons/yr)	r)	
Engine Exhaust Emissions	VOC NOX	00	SOx	PM10
Parking Lot Construction	080 8.31	2.59	0.74	09:0
Building/Addition Const. (total)	1.75	5.59	1.66	1.36
Demolition/Construction Activity				
Mechanical dust Generation	0,000 11 0,000	0.00	0.00	2.09
Total	2,55	8.18	2.41	4.04

Kev.

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide

CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

Source Type         VOCs         NOx           NAS Oceana:         Abobile Sources:         500.57         353.51           Aircraft Operations         500.57         353.51           Cother Mobile Sources:         5.13         26.43           GSE         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           JP-5 Fuel Handling         0.66         0.00           Service Station         19.35         0.00	1993 CO CO 1,018.55 1,018.55 1,018.55 72.65 131.90 1.48 1.48 1.48 1.831	SO2 23.55 23.55 23.55 23.55 6.65 0.45 7.81	EMISSIONS S PM10 PM10 223.43 223.43 6 223.43 6 223.43 6 2.00 46.27 6.27 6.48 48.75 6 3.84	264.85 264.85 264.85 30.13 0.56 33.78	TOR 199 (tol NOX NOX 244.42 244.42 27.35 131.19 6.89	T - NAS OCEANA AND N.  (tons per year)  (tons per year)  1996  NOX CO SO2  NOX CO SO2  44.42 573.37 14.59  27.35 17.03 1.84  31.19 65.36 3.91 6.89 1.48 0.45 (65.43 83.87 6.20	AND NAI 996-1999 17) 14.59 14.59 1.84 3.91 0.45 6.20	LF FENT PM10 180.07 180.07 2.24 48.77 0.48 51.50	ONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 2  FOR 1993 AND 1996-1999  (tons per year)  (tons per year)  (tons per year)  10 VOCs NOx CO SO2 PM10 VOCs   1996  43 264.85 244.42 573.37 14.59 180.07 244.99 25  43 264.85 244.42 573.37 14.59 180.07 244.99 25  0 3.09 27.35 17.03 1.84 2.24 4.57 3	ts 2	1997		
WOCs 500.57 500.57 5.13 ps 71.97 0.56 0.66			223.43 223.43 223.43 2.00 2.00 46.27 0.48 48.75	VOCs 264.85 264.85 30.13 0.56 33.78	244.42 244.42 244.42 241.19 131.19 6.89	1996 CO CO 573.37 573.37 573.37 17.03 65.36 1.48 83.87		PM10 180.07 180.07 2.24 48.77 0.48 51.50	YOCs 244.99 244.99 4.57	NOX	1997		
wocs 500.57 500.57 500.57 5.13 ps 71.97 0.56 0.56 0.66 0.66			223.43 223.43 223.43 2.00 2.00 46.27 0.48 48.75	VOCs 264.85 264.85 3.09 30.13 0.56 33.78	244.42 244.42 27.35 131.19 6.89	CO CO 573.37 573.37 17.03 65.36 1.48 83.87		PM10 180.07 180.07 2.24 48.77 0.48 51.50	VOCs 244.99 244.99 4.57	NOX	1997		
VOCs 500.57 500.57 500.57 513 ps 71.97 0.56 0.56 0.66			223.43 223.43 223.43 2.00 46.27 0.48 48.75	264.85 264.85 3.09 30.13 0.56 33.78	244.42 244.42 27.35 131.19 6.89	573.37 573.37 17.03 65.36 1.48 83.87	14.59 14.59 1.84 3.91 0.45 6.20	180.07 180.07 180.07 2.24 48.77 0.48	244.99 244.99 244.99 4.57	NOX			
esr. 5.13 ps 77.97 e 77.65 e 77.65 e 77.65 e 77.65 e 77.65 e 77.65 0.56			223.43 223.43 2.00 46.27 0.48 48.75	264.85 264.85 3.09 30.13 0.56 33.78	244.42 244.42 27.35 131.19 6.89	573.37 573.37 17.03 65.36 1.48 83.87	14.59 14.59 1.84 3.91 0.45 6.20	180.07 180.07 2.24 48.77 0.48	244.99 244.99 4.57		ව	<b>S0</b> 2	PM10
es: 500.57 500.57 5.13 ps 71.97 0.56 e 77.65 e 77.65 e 77.65 e 77.65 0.71			223.43 223.43 2.00 46.27 0.48 48.75	264.85 264.85 3.09 30.13 0.56 33.78	244.42 244.42 27.35 131.19 6.89	573.37 573.37 17.03 65.36 1.48 83.87	14.59 14.59 1.84 3.91 0.45 6.20	180.07 180.07 2.24 48.77 0.48 51.50	244.99 244.99 4.57				
es: 5.00.57 5.00.57 5.13 ps 77.65 e 77.65 1.13 0.71. 0.71.			223.43 223.43 2.00 46.27 0.48 48.75	264.85 264.85 3.09 30.13 0.56 33.78	244.42 244.42 27.35 131.19 6.89	573.37 573.37 17.03 65.36 1.48 83.87	14.59 14.59 1.84 3.91 0.45	180.07 180.07 2.24 48.77 0.48 51.50	244.99				:
es: 5.13 ps 71.97 0.56 e 77.65 e 77.65 e 77.65 11.13 0.71			223.43 2.00 46.27 0.48 48.75	30.13 0.56 33.78 0.78	24442 27.35 131.19 6.89	17.03 65.36 1.48 83.87	14.59 1.84 3.91 0.45 6.20	2.24 48.77 0.48 51.50	244.99	299.44	567.08	16.62	224.45
e 77.65 e 77.65 e 77.65 e 77.65 2.26 3.26 9.35		1.71 5.65 0.45 7.81 22.09	2.00 46.27 0.48 48.75	3.09 30.13 0.56 33.78	27.35 131.19 6.89	65.36 17.03 17.03 17.03 17.03	3.91 0.45 6.20	2.24 48.77 0.48 51.50	4.57	299.44	567.08	16.62	224.45
5.13 0.56 e 77.65 e 77.65 1.13 0.71 0.71		5.65 0.45 7.81 22.09	2.00 46.27 0.48 48.75	3.09 30.13 0.56 33.78	27.35 131.19 6.89	17.03 65.36 1.48 83.87	3.91 0.45 6.20	2.24 48.77 0.48 51.50	4.57				
e 77.65 e 77.65 1,13 0.71 0.66		5.65 0.45 7.81 22.09	46.27 0.48 48.75 3.84	30.13 0.56 33.78 0.78	131.19 68.9	65.36 1.48 83.87	3.91 0.45 6.20	48.77 0.48 <b>51.50</b>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	34.01	18.73	2.20	2.66
0.56 17.65 1.13 0.71 0.66		0.45 7.81 22.09	9.48 48.75 3.84	0.56 53.78 0.78	6.89	83.87	0.45 <b>6.20</b>	0.48 <b>51.50</b>	31.59	197.60	85.86	5.51	66.41
17.65 17.13 0.71 0.66 19.35		22.09	3.84	33.78 0.78		83.87	6.20	51.50	0.56	6.89	1.48	0.45	0.48
1,13 0.71 3.26 0.66		22.09	3.84	0.78	105.43	63 1			36.72	238.49	106.07	8.17	69.56
1,13 0.71 3.26 0.66		22.09	3.84	0.78		7 63							
11s 3.26. 11mg 0.66.		0.57			29.13	70./	23.76	3.63	0.78	29.13	7.52	23.76	3.63
lling 0.66	1.87	0.57										:	
lling 0.66 [19.35			0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3.77	2.21
lls 3:26. lling 0:66.			V								:		
lling 0.66	26.03	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	3.71
ling 0.66	Sign		, m. , m. h										
19.35	0.00	0.00	0.00	0.46	0.00	00.0	0.00	0.00	0.54	0.00	0.00	0.00	0.00
19.35													
	0.00	0.00	0.00	4.46	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00
の 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1													-
Painting 19.30 0.00	0.00	0.00	0.00	13.29	0.00	0.00	0.00	0.00	14.00	00.00	0.00	0.00	0.00
/\  }													
Construction: 0.00 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00
						A AMARA A A A A A A A A A A A A A A A A							
Total Stationary 44.41 60.88	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
Total NASO 622:64 613.70	1,260.78	54.97	278.91	321.28	469.78	69.969	46.12	238.60	307.57	624.93	727.82	53.57	303.56
NALF Fentress:													
Aircraft 13,48 1.146.63	37.00	6.81	30.87	7.20	145.45	19.20	6.03	39.01	7.73	175.88	19.05	6.88	47.82
Total Annual: 636,12 760,33 1,297.79	1,297.79	61.78	309.78	328.48 615.23	615.23	715.89	52.15	277.61	315.29	800.81	746.87	60.46	351.38

					Table	Fable F-14				
		<b>EMISSI</b>	ONS SUM	MARY-	NAS OCE	ANA AND	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 2	NTRESS.	- ARS 2	
				P.	FOR 1993 AND 1996-1999 (tons per year)	1993 AND 1996-19	666			
A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR			1998		della			1999		a and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s
Source Type	VOCs	NOx	00	S02	PM10	VOCs	NOX	93	S02	PM10
NAS Oceana:										
Mobile Sources:										
Aircraft Operations	445.37	446.01 1,142.62	1,142.62	22.04	313.74	520.36	492.52 1,343.29	1,343.29	24.06	344.22
Total Aircraft	445.37	446.01 1,142.62	1,142.62	22.04	313.74	520.36	520.36 492.52 1,343.29	1,343.29	24.06	344.22
Other Mobile Sources:										
GSE	3.67	34.57	17.17	2.32	2.79	3.69	34.66	17.22	1.73	1.92
Maintenance Run-ups	35.10	189.31	101.35	3.63	86.09	39.88	197.84	114.14	5.26	64.75
Generators	0.56	68.9	1.48	0.45	0.48	0.56	6.89	1.48	0.45	0.48
Total Other Mobile	39.33	230.77	120.00	6.40	64.25	44.13	239.39	132.84	7.44	67.15
Stationary Sources:										
Boilers:	0.62	27.13	89.9	22.82	3.38	. 62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	9.71	54.07	90'.29	1.81	9.73	11.05	58.01	71.61	1.92	11.11
						A SAME A SAME ASSESSED.				;
JP-5 Fuel Handling	0.81	0.00	0.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00
Service Station	6.40	0.00	0.00	0.00	0.00	. 6.72	0.00	0.00	0.00	0.00
The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon										:
Painting	34,12	0.00	0.00	0.00	0.00	41.00	0.00	0.00	0.00	0.00
Construction:	0.00	00'0	0.00	0.00	0.00	2.55	26.13	8.18	2.41	4.04
										. :
Total Stationary	53.77	109.07	81.01	28.40	15.32	64.96	139.15	93.75	30.92	20.74
Total NASO	538.47	785.84	1,343.63	56.84	393.31	629.44	871.05	1,569.87	62.42	432.11
NALF Fentress:										!
Aircraft	8.42	223.37	23.66	8.29	66.36	8.92	238.39	25.63	8.78	72.89
Total Annual	546.88	546.88 1.009.21 1.367.29	1.367.29	65.13	459.67	638.36	1.109.44 1.595.50	1.595.50	71.20	505.00

SO2 = sulfur dioxide. Key: VOC = volatile organic compounds. NOx = oxides of nitrogen. CO = carbon monoxide.

JP-5 = jet fuel.PM10 = particulate matter. JP-5 GSE = Ground Support Equipment

NET EMISSIONS CHANGE - NAS OCEANA AND NALF FENTRESS - ARS 2	S CHANGE - N	AS OCEANA A	ND NALF FE	NTRESS - AR	S 2
		(tons per year)			
Year	VOCs	NOx	00	802	PM10
NAS Oceana:					
1993	622.64	613.70	1260.78	54.97	278.91
1996	321.28	469.78	69.969	46.12	238.60
1997	307.57	624.93	727.82	53.57	303.56
1998	538.47	785.84	1343.63	56.84	393.31
6661	629.44	871.05	1569.87	62.42	432.11
Net Change:					
1993 to 1999	6.80	257.35	309.09	7.45	153.20
NALF Fentress:					
1993	13.48	146.63	37.00	6.81	30.87
1996	7.20	145.45	19.20	6.03	39.01
1997	7.73	175.88	19.05	6.88	47.82
8661	8.42	223.37	23.66	8.29	66.36
6661	8.92	238.39	25.63	8.78	72.89
Net Change:					
1993 to 1999	-4.57	91.76	-11.37	1.97	42.02
Net Change NAS Oceana and NALF Fentress:					
1993 to 1999	2,24	349.11	297.72	9.42	195.22

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

Table F-16
ARS 3
TOTAL AIRCRAFT OPERATIONS AT NAS OCEANA AND NALF FENTRESS
FOR 1993 AND 1996-1999

Aircraft Type	Operation type	1993	1996	1997	1998	1999
F-14A	Full LTO	12,465	9,621	9,828	6,911	6,911
	Touch&Go NASO	15,236	12.331	12,596	10,082	10,082
	GCA Box	2,178	1,048	1,071	1,032	1,032
	Interfacility	2,164	1,768	1,806	1,288	1,288
	Touch&Go NALF	10,511	13,124	13,406	9,784	9,784
F-14B/D	Full LTO	8,551	6,913	10,319	11,058	11,058
	Touch&Go NASO	10,452	7,979	11,910	12,689	12,689
	GCA Box	1,494	586	875	907	907
	Interfacility	1,485	1,269	1,894	2,033	2,033
	Touch&Go NALF	7,226	9,281	13,854	14,865	14,865
A-6	Full LTO	13,401	2,182	0	0	0
	Touch&Go NASO	16,380	2,666	0	0	0
	GCA Box	2,341	381	0	0	0
	Interfacility	2,326	379	0	0	0
	Touch&Go NALF	11,086	1,805	0	0	0
F/A-18	Full LTO	0	1,686	1,686	18,544	21,916
	Touch&Go NASO	0	2,598	2,598	28,579	33,775
	GCA Box	0	0	0	856	1,012
	Interfacility	0	0	0	2,484	2,936
	Touch&Go NALF	0	0.	0	18,416	21,764
A-4	Full LTO	4,169	0	0	0	0
	Touch&Go	5,096	0	0	0	0
F-16	Full LTO	936	0	0	0	0
	Touch&Go	1,144	0	0	0	0
F-5	Full LTO	808	0	0	0	. 0
	Touch&Go	988	0	0	0	. 0
TC-4C	Full LTO	638	0	0	0	0
	Touch&Go	780	0	0	0	0
UH-3H	Full LTO	662	0	0	0	0
C-12	Full LTO	261	1,669	1,669	1,669	1,669
	Touch&Go	445	2,721	2,721	2,721	2,721
	GCA Box	0	1,100	1,100	1,100	1,100
S-3	Full LTO	1,741	967	967	967	967
	Touch&Go	1,295	943	943	943	943
	GCA Box	1,323	367	367	367	367
T-2C	Full LTO	1,418	0	0	0	0
T-34	Full LTO	1,040	1,040	1,040	1,040	1,040
E-2/C-2	Full LTO NALF	1,074	0	0	0	0
	Touch&Go NALF	25,058	20,478	21,374	21,374	21,374
Total		166,172	104,901	112,024	169,709	182,233

### Notes

- (1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual F-14 aircraft population mix at Oceana.
- (2) 1993 Full LTO and Touch and Go NASO operations proportioned from NAS Oceana operations data.
- (3) GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at NAS Oceana. 1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.
- (4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
- (5) A-6 aircraft assumed decommissioned by 1997.
- (6) 1999 and Transient aircraft operations derived from NASMOD analysis (ATAC 1997).
- (7) GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

Key:

LTO = Landing and takeoff cycle

GCA = Ground Control Approach

NASO = Naval Air Station Oceana

NALF = Naval Auxiliary Landing Field

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Aircraft (Engine Model)	Mode (1)	Time in Mode (minutes)	Fuel Flow ((Ib/min)/eng)	Engines		,	Emission Factor	actor	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon		Mods	Modal Emission Rates	Rates	
			(9		VOC(II)	NO	((lb /1000 lb fuell/eng)	uel]/eng)	PMIGO	300000	CA	(lb/mode)		
F-14A	_	7.0	15.33	2	31.42	3.22	55.51	0.54	968	(1) A (2)	NOX	9 k	S02	PM10 (2)
(irs0-P-412A)	ğ	16.0	15.33	2	31.42	3.22	55.51	0.54	8.96	15.41	1.58	77.77	0.12	1.92
	lake Off	4.0	796.67	2	0.20	4.79	10.77	0.54	00.0	0.13	3.05	98.9	0.20	9 0
	Approach	0.4	117.50	2	0.77	19.60	1.38	0.54	2.98	0.07	1.84	0.13	0.05	0.00
	Taxi In/Idle	2 5	/1.6/	2	1,48	10.74	3.43	0.54	7.98	0.28	2.00	0.64	0.10	1 49
	T&G I myel	2.5	15.33	2	31.42	3.22	55.51	0.54	8.96	\$.11	0.52	9.02	0.09	1.46
	GCA Box	7.0	/9.1/	2	1.48	10.74	3.43	0.54	7.98	0.30	2.16	. 69.0	0.11	09
	Interfacility	1.6	71.07	7	.48	10.74	3.43	0.54	7.98	2.06	14.93	4.77	0.75	11.10
	Check Idle	25.0	/1.0/	7	1.48	10.74	3.43	0.54	7.98	0.34	2.46	0.79	0.12	1.83
		2	SCCI	7	71:45	3.22	55.51	0.54	8.96	24.08	2.47	42.55	0.41	6.87
									Touch and Go	0.65	6.00	1.46	0.26	3.37
			-						Full LTO w/hot ref.	27.74	69.6	55.80	0.96	9.54
									Full LTO w/o hot ref.	36.41	10.58	71.12	1.11	12.01
		1							Interfacility	034	2.46	0.79	0.12	1.83
									GCA Box	2.06	14.93	4.77	0.75	11.10
F-14B/D	Idle/Taxi Out	7.0	19.52	2	164	***	16.60	2.20	100					
(F110-GE-400)	Hot Refueling Idle	0.91	19.52	2	3.65	2.77	16.60	0.54	12.38	8:3	0.76	4.54	0.15	3.38
	Take Off	0.4	195.32	- 2	0.40	28.63	0.84	0.54	12.30	87.7	1.73	10.37	0.34	7.73
	Climbout	0.4	195.32	2	0.40	28.63	0.84	0.54	2.81	90.0	700	0.13	0.08	0.44
	Approach	<u></u>	133.03	2	0.26	19.61	0.76	0.54	019	8 8	4.4/	0.13	0.08	0.44
	Taxi In/Idle	5.3	19.52	2	3,65	2.77	16.60	0.54	12.38	200	0.70	07.0	61.0	2.11
	T&G Level	4.1	64.10	2	26.0	8.75	1.64	0.54	6.10	0.17	157	3.43 0.76	2 :0	2.56
	GCA Box	9.7	64.10	7	0.95	8.75	1.64	0.54	6.10	81	10.88	77.0	0.10	100
	intertacility	9.7	64.10	2	960	8.75	1.64	0.54	6.10	0.19	1.79	0.34	0.0	607 501
	Clicck Idle	0.62	19.52	7	3.65	2.77	16.60	0.54	12.38	3.56	2.70	16.20	0.53	12.08
		:							Touch and Go	0.32	12.83	0.69	0.37	3.64
	:						:		Full LTO w/ hot ref.	4.25	18.79	18.87	0.95	16.67
				1				:	Full LTO w/o hat ref.	5.53	19.76	24.70	1.1	21.02
		;		-			1	:	Interlaciinty	673	1.79	0.34	T-0	1.25
		:							Xog Poo	1.18	10.88	2.04	0.67	7.59
A-6	Taxi Out/Idle	7.0	11.33	2	42.20	1.79	63.78	0.54	0.00	69.9	0.28	10 12	000	000
(00-1-7/	Take Off	20.0	11.33	~ 6	42.20	1.79	63.78	0.54	0.00	19.13	0.81	28.91	0.24	0.00
	Climbour	7 0	77.00	7	0.93	13.05	0.71	0.54	0.00	60'0	1.28	0.07	0.05	0.00
	Approach		18 33	7 (	85.0	10.10	3.00	0.54	0.00	0.03	0.58	0.17	0.03	00.0
	Taxi In/Idle	5.3	11 33	7 6	77 1	4.00	10.54	0.54	00.0	0.17	0.63	1.05	0.05	00.0
	T&G Level	4.1	38.33	7 (	62.7	1.0	63.78	0.54	00:0	5.07	0.21	7.66	90.0	0.00
•	GCA Box	9.7	38 33		***		10.34	9.54	0.00	0.18	0.68	1.13	90.0	00.0
•	Interfacility	9.1	38.33	1 6	3,5	0.34	10.34	0.54	0.00	1.28	7.1	7.84	0.40	00.0
	Check Idle	18.0	11.33	- (	100.00	1 70	10.34	0.34		0.21	0.78	1.29	0.07	0.00
				•	37.	277	03./8	0.34	734 	17.21	0.73	26.01	0.22	0.00
									- 1	639	1.89	2.35	0.14	0.00
4				5 60				- 6	Full L.( O w/ hot ref.	31.18	3.81	47.97	0.53	0.00
											-			
						+			200	29.27	3.72	45.08	0.51	0.00

				MODAL	EMISSION	ANS 3 MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	AIRCRAFT A	AT NAS OC	EANA					
Aircraft	Mode	Time in Mode	Fuel Flow	Engines			Emission Factor	ctor		A MILE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE TO THE TAXABLE	Modal	Modal Emission Rates	tes	
(Engine Model)		(minutes)	((lb/min)/eng)		VOCT	) NOT	(jib /1000 ib fuelj/eng)	et /eng)	PM10 (2)	VOCCII	NOX	СО СО	802	PM10 (2)
Y Y	Taxi Out/Idle		11 11		42.20	6/.1	63.78	0.54	0.00	3.11	0.13	4.70	0.04	00.0
(L.52.P.8R)	Take Off	0.4	122.83	-  -	0,93	13.05	0.71	0.54	00:0	0.05	99.0	0.03	0.03	0.00
(22 : 22 2)	Climbout	0.4	72.00	-	0.58	10.10	3.00	0.54	0.00	0.02	0.29	60.0	0.02	0.00
	Approach	1.3	38.33	-	1.72	6.34	10.54	0.54	0.00	60'0	0.32	0.53	0.03	0.00
	Taxi In/Idle	6.5	11.33		42.20	1.79	63.78	0.54	0.00	3.11	0.13	4.70	0.04	00.00
	T&G Level	1.4	38.33		1.72	6.34	10.54	0.54	00:00	0.09	0.34	0.57	0.03	00.0
	Check Idle	18.0	11.33		42.20	1.79	63.78	0.54	00:00	8.61	0.37	13.01	0.11	0.00
									Touch and Go	0.19	0.95	1.18	0.07	0.0
									Full LTO w/o hot ref.	14.97	1.88	23.05	0.26	0.00
	T =													
F-16	Taxi Out/Idle	6.5	17.67	i-	2.26	3.96	19.34	0.54	60.0	0.26	0.45	2.22	90.0	0.01
(F100-PW-100)	Take Off	0.4	736.67	-	0.10	16.50	55.10	0.54	00.0	600	4.86	16.24	0.16	0.00
(	Climbout	0.4	173.33	-	0.05	44.00		0.54	0.83	000	3.05	0.12	0.04	90.0
	Approach	1.3	20.00	-	09.0	11.00	3.00	0.54	0.33	0.04	0.72	0.20	0.04	10.0
	Taxi In/Idle	6.5	17.67	-	2.26	3.96	19.34	0.54	60.0	97.0	0.45	2.22	90.0	0.01
	T&G Level	1.4	20.00	·-	09'0	11.00	3.00	0.54	0.33	0.04	0.77	0.21	0.04	0.05
									Touch and Go	0.08	4.54	0.53	0.11	0.00
									Full LTO w/o hot ref.	65'0	9.54	21.00	0.36	0.088
												11	1   6	:6
F-5	Taxi Out/Idle	6.5	19.9	2	24,25	1.25	159.00	0.54	0.00	2.10	0.11	13.79	0.05	0.00
(J85-GE-21)	Take Off	0.4	177.50	7	0,10	5.60	36.40	0.54	0.00	10.0	0.80	5.17	0.08	0.00
	Climbout	0.4	53.33	7	0.25	5.00	21.56	0.54	0.00	10.0	0.21	76.0	0.02	00.0
	Approach	13	20.00	7	2.58	2.92	46.25	0.54	8 8	2 S	CI.0	12.41	0.03	0.00
	Taxi In/Idle	6.5	29.9	2	24.45	\$7.1 	159:00	4.0 1.54	0.00	71.7	110	7.60	20.00	
	T&G Level	1.4	20.00		2.58	7.92	40.25	0.34	0.00	410	0.10	6.37	0.0	00.00
		:					!	:	Full I TO w/o hot ref		C. 7	36.07	0.00	8
			:	:				-		9	3			}
	T	0,	10.40	,	\$ 18 8	1 16	137.34	0.40	12.38	8.47	0.17	20.00	90.0	1.80
F/A-18	List Defineling Idle	011	10.40		58 18	1.16	137.34	0.40	12.38	13.31	0,27	31.42	60.0	2.83
(r404-GE-400)	Take Off	0.5	473.28	7	0.13	9.22	23.12	0.40	00.00	0.05	3.49	8.75	0.15	0.00
	Climbout	0.4	143.12	2	0.31	25.16	1.05	0.40	2.81	0.04	2.88	0.12	0.05	0.32
	Annroach	13	66.75	7	0.44	8.37	1.78	0.40	01.9	80.0	1.45	0.31	0.07	90.1
	Taxi In/Idle	5.3	10.40	. 2	58.18	1.16	137.34	0.40	12.38	6.41	0.13	15.14	0.04	1.36
	T&G Level	1.7	90.09	7	0,44	8.37	1.78	0.40	6.10	60.0	1.71	0.36	80.0	1.24
	GCA Box	0.6	00.09	2	0.44	8.37	1.78	0.40	6.10	0.48	9.04	1.92	0.43	6.59
	Interfacility	1.4	85.00	2	0.38	11.78	1.16	0.40	6.10	0.09	2.80	0.28	0.10	1.45
	Check Idle	12.0	10.40	2	58.18	917	137.34	0.40	12.38	14.52	0.29	34.28	0.10	3.09
	APU	2.5	3.28	-	0.25	6.25	2.00	0.40	0.22	0.00	0.05	0.02	0.00	0.00
									Touch and Go	0.20	6.04	0.79	0.20	2.62
									Full LTO w/ hot ref.	177.9	8.39	75.74	0.46	7.38
									Full LTO w/o hot ref.		8.46	78.62	0.47	7.64
									Interfacility	0.09	2.80	0.28	0.10	1.45
						The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s					2			

Company   Company	Time in Mode										Modal Emission Rates		
S-3  Taxi Out/Idle (TF34-GE-400) Hot Refueling Id  Take Off Climbout Approach Taxi In/Idle T&G Level GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box GCA Box	(minutes)	Fuel Flow ((lb/min)/eng)	Engines		<b>.</b>	Emission Factor (lb /1000 lb fuell/eng)	ctor el]/eng)			Moda	(Ib/mode)	lates	
1 axi Out/Idle			E. 33	V0C(I)		00	802	PM10 (2)	VOC(1)	NOX		S02	PM10 (2)
. 00		7.63		14.99	69'1	86:06	0.54	3.26	1.49	0.17	9.02	0.03	0.32
C-12/TC-4 (PT6A-41)	-	7.63		14.99	69:1	86.06	0.54	3.26	1.83	0.21	HH	0.07	0.40
C-12/TC-4 (PT6A-41)	0.4	63.33	2	0.39	7.51	5.95	0.54	2.11	0.02	0.38	0.30	0.03	0.11
C-12/TC-4 (PT6A-41)	0.4	7.67			3.42	33.57	0.54	6.85	0.02	0.02	0.21	0.00	0.04
C-12/TC-4 (PT6A-41)	1.3	7.67		2.63	3,42	33.57	0.54	6.85	0.05	0.07	29.0	0.01	0.14
	6.5	7.63				86.06	0.54	3.26	1,49	0.17	9.02	0.05	0.32
C-12/TC-4 (PT6A-41)	<b>8</b> 0.	79.7	2	2.63	3.42	33.57	0.54	6.85	0.07	0.09	0.93	0.01	0.19
C-12/TC-4 (PT6A-41)	7.5	79.7	2	2.63	3.42	33.57	0.54	6.85	0.30	0.39	3.86	0.06	0.79
C-12/TC-4 (PT6A-41)			12.4					Touch and Go	0.14	0.18	1.80	0.03	0.37
C-12/TC-4 (PT6A-41)								Full LTO w/ hot ref.	4.89	1.01	30.33	0.21	1.33
C-12/TC-4 (PT6A-41)								Full LTO w/o hot ref.	3.06	0.80	19.23	0.15	0.93
C-12/TC-4 (PT6A-41)								GCA Box	030	0.39	3.86	0.00	0.79
(PT6A-41)			1200				T				1		
(F16A-41)	19.0	2.45	2	101.63	1.97	115.31	0.54	0.00	97.6	0.18	10.74	0.05	000
:	0.5	8.50	2		7.98	5.10	0.54	0.00	10'0 x	0.07	0.04	0.00	0.00
	2.1	7.88	2	- (a)	7.57	6.49	0.54	0.00	0.07	0.25	0.21	0.02	0.00
	3.7	4.55	2		4.65	34.80	0.54	0.00	0.76	0.16	1.17	0.02	0.00
	7.0	2.45	7		1.97	115.31	0.54	0.00	3.49	0.07	3.96	0.02	0.00
I&G Level	2.0	4.55	2		4.65	34.80	0.54	0.00	0.41	80.0	0.63	0.01	0.00
GCA Box	7.5	4.55	2	22.71	4.65	34.80	0.54	0.00	1.55	0.32	2.38	0.04	0.00
			 					Touch and Go	1.25	64.0	2.02	0.05	0.00
	:	:					l baller	Full LTO w/o hot ref.	13.79	0.73	16.12	0.11	0.00
			1					GCA Box	1.55	0.32	2.38	0.04	0.00
100	100										-		
CTSO CE OEN TELESTOR	0. io	2.20	7	:: 10 : 20 : 20 : 20	1.43	178.44	0.54	0.00	4.59	0.03	6.28	0.02	0.00
	0.0	13.10			5,47	9.03	0.54	0.00	0.00	0.00	0.00	00.0	0.00
CIIMBout	7.0	10.45	_1		4.68	14.13	0.54	0.00	0.10	80.0	0.11	0.03	0.00
Approach	5.7	9.68		1.12	4.47	17.28	0.54	0.00	0.13	0.53	2.06	90.0	0.00
l axi in/ldle	7.0	2.20	2		1.43	178.44	_	00.00	4.02	0.04	5.50	0.02	0.00
					2		<u> </u>	Full LTO w/o hot ref.	8.84	0.71	13.94	0.13	0.00
											, T		
	6.5	1.92	- 1		2,43	64.00	0.54	0.00	0.63	0.03	08.0	0.01	0.00
(P16A-25) Take Off	0.4	7.08		. 00'0	7.81	1.01	0.54	00.00	000	0,02	0.00	0.00	0.00
Climbout	0.4	6.67	Ag		7.00	1.20	0.54	0.00	0.00	0.02	0.00	00.0	00.0
Approach	1.3	3.58	_		8.37	23.02	0.54	0.00	10'0	0.04	0.11	00.0	00.00
Taxi In/Idle	6.5	1.92	-	50.17	2.43	64.00	0.54	0.00	0.63	0.03	08.0	0.01	00.00
			22				<b>4</b>	Full LTO w/o hot ref.	126	0.14	1.71	0.02	0.00

## MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA

Aircraft	Mode	Time in Mode	Fuel Flow	Engines			<b>Emission Factor</b>	tor			Modal	<b>Emission Rates</b>	ates	
(Engine Model)		(minutes)	((lb/min)/eng)			<u>e</u>	[lp /1000 lb fuel]/eng)	l/eng)			•	(lb/mode)		
,					NOC(I) N	NON	8	S02	PM10 (2)	VOC(II)	NOx	8	<b>S02</b>	PM10 (2)
T-2	Taxi Out/Idle	6.5	9.33	2		88	111.86	0.54	0.00	1,44	0.45	13.57	0.07	0.00
(J85-GE-2)	Take Off	0.4	48.17	2		0	21.56	0.54	00.0	0.02	0.25	0.83	0.02	0.00
·	Climbout	0.4	35.92	2	0.64 5.6	2.67	28.38	0.54	00.00	0.02	91.0	0.82	0.02	0.00
	Approach	1.3	17.42	2		12	63.53	0.54	00.00	0.11	0.18	2.88	0.02	0.00
	Taxi In/Idle	6.5	9.33	2		88	111.86	0.54	00:00	1.44	0.45	13.57	0.07	00.00
									Full LTO w/o hot ref	ef. 3.02	1.48	31.66	0.19	0.00
	·		, , , , , , , , , , , , , , , , , , ,											
E-2/C-2	Taxi Out/Idle	19.0	86.6	2		23	30.11	0.54	0.00	7.30	1.34	11.42	0.20	0.00
(T56-A-16)	Take Off	0.5	36.98	2	\$2 \$2	45	0.65	0.54	00.00	0.01	0.39	0.02	0.02	0.00
· -	Climbout	2.1	36.98	2	0.14 10.	10.45	9.65	0.54	0.00	0.02	1.62	0.10	0.08	0.00
	Approach	3.7	33.27	2		33	0.42	0.54	0.00	0.04	2.44	0.10	0.13	0.00
	Taxi In/Idle	7.0	86.6	2		53	30.11	0.54	0.00	2.69	0.49	4.21	0.08	0.00
_	T&G Level	1.6	15.00	2		52	4.54	0.54	0.00	0.05	0.31	0.22	0.03	0.00
									Touch and Go	0.11	4.38	0.42	0.24	0.00
									Full LTO w/o hot ref.	ef. 10.05	6.29	15.85	0.52	0.00

Notes: F-37

(1) Aircraft VOC reported as HC in the form CHy/x

(2) Emission factors equal to 0.00 for PM10 indicate that no factor has been determined (AESO 1996).

(3) Emission factors from AESO Report Number 6-90 and USEPA AP-42.

(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

T&G, GCA Box and Interfacility level flight TIMs based on flight track profile speeds and distance for F-14, E-2/C-2, F/A-18 and S-3 aircraft. Level TIMs for C-12s and TC-4s were assumed to be the same as E-2/C-2 All other aircraft are assumed to have the same level TIMs as F-14s. Modal emission rates calculated from data provided by AESO. 3

Modal emission rates for T&G operations include approach, climbout, and T&G level modes only.

(8) Modal emission rate for full LTO w/o hot refueling includes APU use (F/A-18 only) and check idle mode.

(9) Modal emission rate for full LTO w/hot refueling does not include APU use (F/A-18 only) or check idle mode.

(10) GCA box and interfacility mode emission rates are presented only for aircraft that conduct low-altitude operations between NAS Oceana and NALF Fentress.

(11) F-14B and F-14D have the same engine types, and therefore, have identical emission rates.

(12) TC-4s are assumed to have the same emission rates as C-12s.

(13) FCLP mode is included in T&G since flight modes are similar.

Key:

LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle VOC = volatile organic compounds LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle NOx = oxides of nitrogen LTO w/o hot ref. = landing and takenff our anithms.

GCA = ground control approach T&G = touch and go CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

TIM = time in mode

Interfacility = low altitude operations between NAS Oceana and NALF Fentress

AESO = Aircraft Environmental Support Office

Hard				A		FOR 1993 AND 1996-1999	1996-1999		1				
First   Proposition/Volpered   Total   Proposition   Total   Total   Proposition   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   T	Lype		Number of		-	Z	0.0	2	Ω	S	72	4	М10
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Fig.   The whole field   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,15   1,1				<b>a</b>	(ILX)	(a)	(TPX)	(Ib)	(TPY)	<b>(a)</b>	(TPY)	<b>(a</b>	(TPY)
Fall LTO we have ref   3.54   3.64   170   10.55   4.77   1.18   1.10   1.10   1.20   1.20   1.11   1.20   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10   1.10		i	3,116	27.74	43.22	6.69	15,10	55.80	86.94	96.0	1.50	9.54	14.87
Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocco beacter  Cocc		Full LTO w/o hot ref.	9,349	36.41	170.19	85'01	49.45	71.12	332.43		5.20	12.01	56.16
CACA Daw         2.1/8         2.06         2.24         1.62         2.67         0.75         0.82         1.11           Figu L 10 ow basing         2.1/8         2.06         2.07         0.75         0.75         0.82         1.10           Figu L 10 ow basing         2.1/8         2.34         4.74         3.56         4.77         1.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07         0.07		Touch&Go	15,236	59'0	491	90.9	45.70	1.46	11.10	0.26	861	3.37	25.66
Interchality   2,164   0,34   0,37   2,46   2,57   0,75   0,15   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,183   1,1		GCA Box	2,178	2.06	2.24	14.93	16.26	4.77	5.19	0.75	0.82	11.10	12.08
Full LTO while her ref.   5118   425   434   81879   20309   18871   2017   0555   1102   1687   1104   1414   1565   1102   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1104   1		Interfacility	2,164	0.34	0.37	2.46	2.67	0.79	0.85	0.12	0.13	1.83	1.98
Full LTO we hater!   6,144   4.25   4.45   8.87   6.000   8.87   5.000   114   5.65   16.67   114   15.65   15.67   114   15.65   15.67   114   15.65   15.67   114   15.65   15.67   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   15.65   114   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   115   11													!
Pull LTO who but ref   6,414   353   1713   1936   6338   3470   7950   114   356   2102     CCA Roy   1,494   113   1636   1243   1713   204   152   0457   035   1754     CCA Roy   1,494   113   0.88   1034   133   134   0.55   0.65   1754     Full LTO who kin'ef   1380   1314   222   131   0.55   132   0.65   0.00     Full LTO who kin'ef   1380   1312   1312   1313   1313   1313   0.00     Full LTO who kin'ef   1380   1312   1313   1313   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1313   1313   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1313   1315   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1313   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1315   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1315   1315   1315   1315   0.00     Full LTO who kin'ef   1380   1312   1315   1315   1315   0.00     Full LTO who kin'ef   1313   1315   1315   1315   0.01   0.00     Full LTO who kin'ef   1313   1315   1315   1315   0.01   0.00     Full LTO who kin'ef   1315   1315   1315   0.01   0.00     Full LTO who kin'ef   1315   1315   0.01   0.01   0.00     Full LTO who kin'ef   1315   1315   0.01   0.01   0.00     Full LTO who kin'ef   1315   1315   0.01   0.01   0.00     Full LTO who kin'ef   1315   1315   0.01   0.01   0.00     Full LTO who kin'ef   1315   1315   0.01   0.01   0.00     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01   0.01   0.01     Full LTO who kin'ef   1315   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01   0.01	F-14E		2,138	4.25	4.54	18.79	20.09	18.87	20.17	26:0	1.02	19.91	17.81
Trouch&Go   10,432   0.33   1.69   12.83   5/13   0.59   5.50   0.57   1.52   1.55    Trouch&Go   10,432   1.18   0.18   1.28   1.13   1.53   1.54   0.51   1.53   0.54   1.15   0.58   1.15    Full LTO we hatef   1.350   1.11   1.22   1.37   1.37   1.37   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57   1.57		Full LTO w/o hot ref.	6,414	5.53	17.73	92.61	63.38	24.70	79.20	1.14	3.66	21.02	67
GCA Box         1.44         1.18         0.88         18.3         2.04         1.25         0.57         0.57         0.57         0.57         0.57         0.57         0.57         0.57         0.57         0.57         0.57         0.58         1.25         0.00         1.25         0.00         1.25         0.00         1.25         0.00         1.25         0.00         0.00         1.25         0.00         0.00         1.25         0.00         0.00         1.25         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	!	Touch&Go	10,452	0.32	1.69	12.83	67.03	69:0	3.60	0.37	1.92	3.64	61.
Figl LTO who kired   3130   3118   5224   381   6.38   47.97   80.37   0.53   0.58   0.00     Figl LTO who kired   3130   3118   5224   381   6.38   47.97   80.37   0.53   0.58   0.00     Figl LTO who kired   3130   3119   1.89   1.87   1.53   1.53   2.53   0.14   0.00     Figl LTO who kired   4.180   4.79   1.12   1.87   1.53   1.75   1.53   0.00     Figl LTO who kired   5.06   0.19   0.25   0.07   0.18   0.00     Figl LTO who kired   5.06   0.19   0.28   0.14   0.25   0.15   0.15   0.10     Figl LTO who kired   8.08   4.38   4.46   0.19   0.14   0.15   0.00     Figl LTO who kired   8.08   4.38   4.46   0.19   0.14   0.15   0.00     Figl LTO who kired   8.08   4.38   1.77   1.38   0.56   0.59   0.15   0.00     Figl LTO who kired   8.08   4.38   1.77   1.38   0.56   0.19   0.00     Figl LTO who kired   8.08   4.38   1.77   1.38   0.56   0.19   0.00     Figl LTO who kired   8.08   4.38   1.77   1.38   0.56   0.19   0.00     Figl LTO who kired   8.08   4.38   1.77   1.38   0.56   0.19   0.00     Figl LTO who kired   8.08   4.38   1.37   0.23   0.14   0.01   0.00     Figl LTO who kired   8.08   4.38   2.22   0.71   0.23   0.15   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.25   0.43   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.00   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.00   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.00   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.00   0.00     Figl LTO who kired   8.00   4.35   0.34   0.11   0.00   0.00     Figl LTO who kired   8.00   0.34   0.35   0.35   0.35   0.35   0.35   0.00     Figl LTO who kired   8.00   0.34   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.	!	GCA Box	1,494	81.1	0.88	10.88	8.13	2.04-	1.52	0.67	0.50	7.59	5.0
Full LTO w/ boir et   1350   3118   5234   388   638   4197   8037   6351   256   6000     Full LTO w/ boir et   10361   2327   4410   312   1831   2458   25537   6351   256   6000     Couch&Co.   1,346   0.25   1.19   1.18   1.15   1.20   0.07   0.07   0.08     Full LTO w/o boir et   1580   1.20   0.28   0.28   2.41   1.18   3.00   0.07   0.09     Full LTO w/o boir et   1.35   0.28   0.28   0.24   4.40   0.73   0.25   3.50     Full LTO w/o boir et   888   4.38   1.37   4.40   0.73   0.20   0.19   0.00     Full LTO w/o boir et   888   4.38   1.37   4.40   0.73   0.20   0.19   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   1.25   0.04   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.05   0.05   0.00     Full LTO w/o boir et   880   0.04   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05		Interfacility	1,485	0.19	0.14	62.1	1.33	0.34	0.25	0.11	0.08	1.25	0.
Full LTO w/o bir ref.         3.35         3.11.8         3.24.4         3.18         6.38         47.97         36.37         0.53         0.89         0.00           Full LTO w/o bir ref.         1,350         3.11.8         3.24.4         3.19         1.37         4.39         2.35         0.14         1.79         0.00           Full LTO w/o bir ref.         1,380         0.39         3.12         1.84         1.87         1.87         0.00         0.00           Full LTO w/o bir ref.         3.09         1.28         3.09         1.23         3.00         0.07         0.03         0.00           Full LTO w/o bir ref.         3.09         0.23         0.23         2.34         4.46         2.10         9.83         0.36         0.17         0.09           Full LTO w/o bir ref.         3.09         0.23         0.23         2.34         4.46         2.10         9.83         0.37         0.17         0.09           Full LTO w/o bir ref.         3.08         4.34         2.39         3.07         1.45         0.00         0.07         0.07         0.09           Full LTO w/o bir ref.         8.08         4.38         1.77         1.38         0.56         3.04         0.00		!											
Full LTO w/o hoi ref.   10.051   2527   47.10   3.72   18.72   45.68   226.57   0.51   1.55   0.00     Touch&Co	A-6	:	ļ	31.18	52.24	3.81	6.38	47.97	80.37	0.53	0.89	00.0	00.00
Touchkidgo   15,380   0.359   3.159   1.85   15.51   2.35   19.28   0.14   1.17   0.00	·	Full LTO w/o hot ref.	:	29.27	147.10	3.72	18.72	45.08	226.57	0.51	2.56	00.00	0.0
CAC Biox   2.34    1.28		Touch&Go	16,380	0.39	3.19	68.1	15.51	2.35	19.28	0.14	1.17	00.0	0.0
Hair Trouch Rotor of Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Association   Associa		GCA Box	2,341	1.28	1.50	4.71	5.52	7.84	9.17	0.40	0.47	00.00	00
Full LTO w/o hoi ref.   4,169		Interfacility	2,326	0.21	0.25	0.78	06'0	1.29	1.50	0.07	0.08	00:00	0.0
Full LTO w/o bio iref         4 169         14.37         31.21         1.88         3.99         23.05         48.05         0.25         0.53         0.00           Full LTO w/o bio iref         3.086         0.13         0.25         2.41         1.18         3.00         0.07         0.18         0.00           Full LTO w/o bio iref         936         0.59         0.24         4.46         2.100         9.83         0.35         0.17         0.09           Full LTO w/o bio iref         808         4.38         1.77         1.38         0.56         3.50         0.11         0.00         0.00           Full LTO w/o bio iref         808         4.38         1.77         1.38         0.55         3.50         0.11         0.00         0.00           Full LTO w/o bio iref         838         1.23         0.44         0.73         0.23         1.612         3.14         4.61         0.01         0.00           Full LTO w/o bio iref         662         8.84         2.92         0.71         0.23         0.79         0.03         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00<			_										!
Full LTO w/o hot ref.   5366   0.19   0.25   0.28   9.34   4.46   11.00   9.81   0.35   0.35   0.00   0.00     Full LTO w/o hot ref.   638   4.38   1.77   1.38   0.35   0.35   0.31   0.00   0.00     Full LTO w/o hot ref.   652   8.84   2.92   0.71   0.23   0.35   0.35   0.35   0.35   0.00     Full LTO w/o hot ref.   652   8.84   2.92   0.71   0.23   0.35   0.35   0.35   0.35   0.00     Full LTO w/o hot ref.   652   8.84   2.92   0.71   0.23   13.94   4.61   0.13   0.00     Full LTO w/o hot ref.   870   4.89   2.13   1.01   0.44   30.33   13.20   0.35   0.05   0.00     Full LTO w/o hot ref.   870   4.89   2.13   1.01   0.44   30.33   13.20   0.35   0.05   0.00     Full LTO w/o hot ref.   870   4.89   2.13   1.01   0.44   30.33   13.20   0.35   0.05   0.00     Full LTO w/o hot ref.   870   4.89   2.13   1.01   0.44   30.33   13.20   0.35   0.05   0.00     Full LTO w/o hot ref.   870   4.89   2.13   1.01   0.44   30.33   13.20   0.35   0.05   0.00     Full LTO w/o hot ref.   870   3.00   0.39   0.35   0.35   0.35   0.05   0.05   0.00     Full LTO w/o hot ref.   1.418   3.30   2.14   1.48   1.05   31.66   22.35   0.05   0.01   0.00     Full LTO w/o hot ref.   1.418   3.30   2.14   1.48   1.05   31.66   22.35   0.05   0.01   0.00     Full LTO w/o hot ref.   1.418   3.30   2.14   1.48   1.05   0.35   0.35   0.35   0.35   0.05   0.05   0.05     Full LTO w/o hot ref.   1.418   3.30   2.14   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0	A-4	1		14.97	31.21	1.88	3,91	23.05	48.05	0.26	0.54	00.0	. 0.0
Full LTO w/o hot ref.         936         0.59         934         4.46         2100         983         0.36         0.17         0.09           Full LTO w/o hot ref.         1,144         0.08         0.03         4.34         4.46         2100         983         0.35         0.17         0.09           Full LTO w/o hot ref.         808         4.38         1.77         1.38         0.55         36.07         14.57         0.22         0.09         0.00           Full LTO w/o hot ref.         638         13.79         4.40         0.73         0.25         36.07         14.57         0.22         0.09         0.00           Full LTO w/o hot ref.         638         13.79         4.40         0.73         0.23         16.12         2.14         0.11         0.00           Full LTO w/o hot ref.         652         8.84         2.92         0.71         0.23         13.44         4.61         0.13         0.04         0.00           Full LTO w/o hot ref.         652         8.84         2.92         0.71         0.23         13.24         4.61         0.11         0.00           Full LTO w/o hot ref.         1.23         0.28         0.73         0.09         0.13	: -	Touch&Go	5,096	0.19	0.50	0.95	2.41	1.18	3.00	0.07	0.18	00.00	0.0
Full LTO w/o hoi reif         836         0.59         0.28         95.4         4.46         21.00         983         0.35         0.17         0.09           Touch&Co         1,144         0.08         0.08         4.54         2.59         0.53         0.53         0.61         0.09         0.00           Full LTO w/o hoi reif         808         4.38         1,77         1.38         0.56         3.607         14.57         0.22         0.09         0.00           Full LTO w/o hoi reif         808         4.38         1,77         4.40         0.73         0.23         16.12         5.14         0.11         0.03         0.00           Full LTO w/o hoi reif         652         8.84         2.92         0.71         0.23         15.19         4.61         0.13         0.04         0.00           Full LTO w/o hoi reif         662         8.84         2.92         0.71         0.23         15.13         4.61         0.13         0.04         0.00           Full LTO w/o hoi reif         870         4.86         2.13         1.01         0.44         0.73         0.05         0.13         0.01         0.00           Full LTO w/o hoi reif         870         4.86 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>:</td> <td></td> <td></td>											:		
Touch&Go         1,144         0.08         0.03         4.34         2.59         0.51         0.06         0.09           Full LTO w/o hoi ref         808         4.38         1.77         1.38         0.36         3.507         14.57         0.22         0.09         0.00           Full LTO w/o hoi ref         638         13.79         4.40         0.73         0.26         3.51         0.14         0.03         0.00           Full LTO w/o hoi ref         638         13.79         4.40         0.73         0.23         16.12         3.14         0.01         0.00           Full LTO w/o hoi ref         638         8.84         2.92         0.71         0.23         1.51         0.04         0.00           Full LTO w/o hoi ref         662         8.84         2.92         0.71         0.23         1.51         0.04         0.00           Full LTO w/o hoi ref         652         8.84         2.92         0.71         0.23         1.51         0.04         0.01         0.00           Full LTO w/o hoi ref         870         4.89         2.13         1.01         0.04         0.01         0.01         0.00         0.01         0.00           Full LTO w/o hoi r	F-16	-		65.0	0.28	9.54	4.46	21.00	9.83	0.36	0.17	0.09	0.04
Full LTO w/o hoi ref         808         4.38         1.77         1.38         0.56         3.607         14.57         0.22         0.09         0.00           Full LTO w/o hoi ref         638         0.29         0.14         0.53         0.26         5.91         2.92         0.08         0.09         0.00           Full LTO w/o hoi ref         638         13.79         4.40         0.73         0.23         16.12         3.14         0.11         0.03         0.00           Full LTO w/o hoi ref         662         8.84         2.92         0.71         0.23         1.39         4.61         0.13         0.04         0.00           Full LTO w/o hoi ref         662         8.84         2.92         0.71         0.23         0.73         0.09         16.12         2.10         0.11         0.00           Full LTO w/o hoi ref         870         4.85         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hoi ref         1.733         0.39         0.39         0.38         0.35         0.05         0.01         0.00           Full LTO w/o hoi ref         1.418         3.02         2.14 <td< td=""><td></td><td>Touch&amp;Go</td><td>1,144</td><td>80.0</td><td>0.05</td><td>4.54</td><td>2.59</td><td>0.53</td><td>0.30</td><td>0.11</td><td>90.0</td><td>60.0</td><td>0.05</td></td<>		Touch&Go	1,144	80.0	0.05	4.54	2.59	0.53	0.30	0.11	90.0	60.0	0.05
Full LTO w/o hot ref         888         4.38         1,77         1.38         0.36         36,07         14,37         0.22         0.09         0.00           Full LTO w/o hot ref         638         13.79         4.40         0,73         0.23         16.12         5.14         0.11         0.03         0.00           Full LTO w/o hot ref         638         13.79         4.40         0,73         0.23         16.12         5.14         0.11         0.03         0.00           Full LTO w/o hot ref         652         8.84         2.92         0.71         0.23         15.94         4.61         0.13         0.04         0.00           Full LTO w/o hot ref         261         13.79         1.80         0.73         0.09         16.12         2.10         0.11         0.00           Full LTO w/o hot ref         870         4.88         2.13         1.01         0.44         30.33         13.20         0.21         0.09         0.01         0.00           Full LTO w/o hot ref         1,325         0.14         0.09         0.18         0.12         0.15         0.05         0.01         0.09         0.13         0.17         0.05         0.01         0.01         0.00									:		:		_
Touch&Co         988         0.29         0.14         0.53         0.26         5.91         2.92         0.08         0.04         0.00           Full LTO w/o hoi ref.         638         13.79         4.40         0.73         0.23         16.12         5.14         0.11         0.03         0.00           Full LTO w/o hoi ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.04         0.00           Full LTO w/o hoi ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.04         0.00           Full LTO w/o hoi ref.         261         13.79         1.80         0.73         0.09         16.12         2.10         0.11         0.00         0.01         0.00           Full LTO w/o hoi ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.05         0.01         0.00           Full LTO w/o hoi ref.         870         0.30         0.34         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.04 <t< td=""><td>F-5</td><td>Full LTO w/o hot ref.</td><td>808</td><td>4.38</td><td>1.77</td><td>1.38</td><td>0.56</td><td>36.07</td><td>14.57</td><td>0.22</td><td>0.09</td><td>00.00</td><td>0.00</td></t<>	F-5	Full LTO w/o hot ref.	808	4.38	1.77	1.38	0.56	36.07	14.57	0.22	0.09	00.00	0.00
Full LTO w/o hoiref.         638         13.79         4.40         0.73         0.23         16.12         5.14         0.11         0.03         0.00           Touch&Co         780         1.25         0.49         0.49         0.19         2.02         0.79         0.05         0.00         0.00           Full LTO w/o hoi ref.         662         8.84         2.92         0.71         0.23         1.394         4.61         0.13         0.04         0.00           Full LTO w/o hoi ref.         261         13.79         1.80         0.73         0.09         16.12         2.10         0.11         0.01         0.00           Full LTO w/o hoi ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hoi ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.15         0.05         0.01         0.00           Full LTO w/o hoi ref.         870         4.89         2.13         1.08         0.15         0.15         0.05         0.01         0.05         0.01         0.05         0.05         0.05         0.05 <t< td=""><td></td><td>Touch&amp;Go</td><td>886</td><td>0.29</td><td>0.14</td><td>0.53</td><td>0.26</td><td>5.91</td><td>2.92</td><td>80.0</td><td>0.04</td><td>00.00</td><td>00.00</td></t<>		Touch&Go	886	0.29	0.14	0.53	0.26	5.91	2.92	80.0	0.04	00.00	00.00
Full LTO w/o hoi ref.         638         1379         440         073         023         1612         514         0.11         0.03         0.00           Full LTO w/o hoi ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.04         0.00           Full LTO w/o hoi ref.         261         13.79         1.80         0.73         0.09         16.12         2.10         0.11         0.04         0.00           Full LTO w/o hoi ref.         261         1.379         1.80         0.73         0.09         16.12         2.10         0.11         0.04         0.00           Full LTO w/o hoi ref.         870         4.89         2.13         1.01         0.44         30.33         13.26         0.21         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.00         0.01         0.01         0.00         0.01         0.00         0.01         0.00									:				
Full LTO w/o hot ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.02         0.00           Full LTO w/o hot ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.04         0.00           Full LTO w/o hot ref.         261         1.379         1.80         0.73         0.09         16.12         2.10         0.11         0.01         0.00           Full LTO w/o hot ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         3.06         1.33         0.38         0.35         0.15         0.05         0.05         0.09         0.13         0.12         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05         0.05	TC-4		638	13.79	4.40	0.73	0.23	16.12	5.14	0.11	0.03	00.00	0.0
Full LTO w/o hot ref.         662         8.84         2.92         0.71         0.23         13.94         4.61         0.13         0.04         0.00           Full LTO w/o hot ref.         261         13.79         1.80         0.73         0.09         16.12         2.10         0.11         0.01         0.00           Full LTO w/o hot ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         0.36         0.18         0.12         180         1.77         0.03         0.05         0.33           Full LTO w/o hot ref.         1,323         0.36         0.14         0.09         0.18         0.12         1.80         1.71         0.03         0.04         0.79           Full LTO w/o hot ref.         1,418         3.02         2.14         1.05         31.66         2.245         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.14		Touch&Go	780	1.25	0,49	0.49	0.19	2.02	0.79	0.05	0.02	00.00	0.0
Full LTO w/o hot ref.         262         8.84         2.92         0.71         0.63         4.61         0.13         0.04         0.00           Full LTO w/o hot ref.         261         13.79         1.80         0.73         0.69         16.12         2.10         0.11         0.01         0.00           Full LTO w/o hot ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         3.06         1.33         0.80         0.35         19.23         8.37         0.15         0.05         0.53           GCA Box         1,323         0.34         0.09         0.18         0.12         1.80         1.17         0.03         0.05         0.37           Full LTO w/o hot ref.         1,418         3.02         2.14         1.48         1.05         3.16         2.245         0.19         0.14         0.00           Full LTO w/o hot ref.         1,418         3.02         2.14         1.48         1.05         3.16         2.245         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0	100	-	1										
Full LTO w/o hot ref.         251         L379         180         6,73         6,69         16,12         2.10         0.11         0.01         0.00           Touch&GG         445         1,25         0,28         0,49         0,11         2,02         0,45         0,01         0,01         0,00           Full LTO w/o hot ref.         870         4,89         2,13         1,01         0,44         30.33         13,20         0,21         0,09         1,33           Full LTO w/o hot ref.         870         3,06         1,33         0,80         0,35         1,923         8,37         0,15         0,06         0,93           Full LTO w/o hot ref.         1,323         0,30         0,38         0,12         1,86         1,17         0,03         0,04         0,79           Full LTO w/o hot ref.         1,418         3,02         2,14         1,48         1,05         31,66         2,245         0,19         0,14         0,00           Full LTO w/o hot ref.         1,040         1,26         0,66         0,14         0,07         0,19         0,14         0,09         0,14         0,00         0,19         0,14         0,00         0,19         0,14         0,00	16-40	:	790	8.84	2.92	0.71	0.23	13.94	4.61	0.13	0.04	00.0	0.0
Touch&Go         445         1.25         0.28         0.49         0.11         2.02         0.45         0.11         0.00         0.01         0.00           Full LTO w/ hot ref.         870         4.89         2.13         1.01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         3.06         1.33         0.80         0.35         1.923         8.37         0.15         0.09         1.33           Full LTO w/o hot ref.         1,295         0.14         0.09         0.18         0.12         1.80         1.17         0.03         0.05         0.37           GCA Box         1,323         0.30         0.39         0.26         3.86         2.55         0.06         0.04         0.79           Full LTO w/o hot ref.         1,418         3.02         2.14         1,48         1,05         31.66         22.45         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         0.01         0.01         0.00	C-12		196	11 70	US I	0.73	0.00	16.15	2.10	. 11 0	iği	90.0	:
Full LTO w/ hot ref.         870         4.89         2.13         1 01         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         3.06         1.33         0.80         0.35         19.23         8.37         0.15         0.06         0.93           Touch&Go         1,295         0.14         0.09         0.12         1.80         1.17         0.03         0.02         0.37           GCA Box         1,323         0.30         0.20         0.39         0.26         3.86         2.55         0.06         0.04         0.79           Full LTO w/o hot ref.         1,418         3.02         2.14         1.48         1.05         31.66         22.45         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         0.01         0.00			445	1.25	0.28	0.40	11.0	202	0.45	0.05	100	00.0	) ic
Full LTO w/o hot ref.         870         4.89         2.13         101         0.44         30.33         13.20         0.21         0.09         1.33           Full LTO w/o hot ref.         870         3.06         1.33         0.80         0.35         19.23         8.37         0.15         0.06         0.93           Touch&Go         1,295         0.14         0.09         0.18         0.12         1.80         1.17         0.03         0.02         0.37           GCA Box         1,323         0.30         0.39         0.26         3.86         2.55         0.06         0.04         0.79           Full LTO w/o hot ref.         1,418         3.02         2.14         1.48         1.05         31.66         22.45         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         0.17         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>3</td><td>2</td><td>8</td><td></td></td<>										3	2	8	
Full LTO W/o hot ref.         870         3.06         1.33         0.80         0.35         19.23         8.37         0.15         0.06         0.93           Touch&Go         1,295         0.14         0.09         0.18         0.12         1.80         1.17         0.03         0.02         0.37           GCA Box         1,323         0.30         0.39         0.26         3.86         2.55         0.06         0.04         0.79           Full LTO w/o hot ref.         1,418         3.02         2.14         1.48         1.05         31.66         22.45         0.19         0.14         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00	S-3	Full LTO w/ hot ref.	870	4.89	2.13	101	0.44	30.33	13.20	0.21	0.09	1.33	0.5
Touch&Go         1,295         0,14         0,09         0,18         0,12         1,80         1,17         0,03         0,02         0,37           GCA Box         1,323         0,30         0,20         0,39         0,26         3.86         2.55         0,06         0,04         0,79           Full LTO w/o hot ref.         1,418         3,02         2,14         1,48         1,05         31.66         22,45         0,19         0,14         0,00           Full LTO w/o hot ref.         1,040         1,26         0,66         0,14         0,07         1,71         0.89         0,02         0,01         0,00		Full LTO w/o hot ref.	870	3,06	1.33	080	0.35	19.23	8.37	0.15	90.0	0.93	0.4
GCA Box         1,323         0,30         0,20         0,26         3.86         2.55         0.06         0.04         0,79           Full LTO w/o hot ref.         1,418         3,02         2,14         1,48         1,05         31.66         22,45         0,19         0.14         0.00           Full LTO w/o hot ref.         1,040         1,26         0,66         0,14         0,07         1.71         0.89         0,02         0,01         0,00		Touch&Go	1,295	0.14	0.00	0.18	0.12	1.80	1.17	0.03	0.02	0.37	0.24
Full LTO w/o hot ref.         1,418         3,02         2,14         1,48         1,05         31.66         22,45         0,19         0,14         0,00           Full LTO w/o hot ref.         1,040         1,26         0,66         0,14         0,00         1,71         0,89         0,02         0,01         0,00		GCA Box	1,323	0.30	0.20	0.39	0.26	3.86	2.55	90.0	0.04	0.79	0.52
Full LTO W/o hot ref         1,418         3.02         2.14         1.48         1.05         31.66         22.45         0.19         0.14         0.00           Full LTO W/o hot ref         1,040         (1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00													
Full LTO w/o hot ref.   1,040   1.26   0.66   0.14   0.07   1.71   0.89   0.02   0.01   0.00	T-2C		1,418	3.02	2.14	1.48	1.05	31.66	22.45	0.19	0.14	00.00	00.0
Full LTO Wo hot ref.   1,040   (1.26   0.066   0.14   0.07   1.71   0.89   0.02   0.01   0.00													
	T-34		1,040		99.0	0.14	000	1.71	0.89	000	100	900	UU

						ARS 3					,		
-				₹	IRCRAFT FOR	FT EMISSIONS AT NAS FOR 1993 AND 1996-1999	IRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	EANA					
	Type of	Operation	Number of	AOC	E	Ž	<b>5</b>		60	)S	S02	PA	PMIO
	Aircraft		Operations/Year per operation	per operation	Total	per operation	Total	per operation		per operation	Total	per operation	<u> </u>
1996	F-14A	Full LTO w/hot ref.	2.405	27.74	33.36	69'6	(1.11)	55.80	67.10	0.0	115	(an)	(1FY)
		_=	7,216	36.41	131.36	10.58	38.17	71.12	256.58		4 02	12.01	41.15
		Touch&Go	12,331	0.65	3.98	90'9	36.99	1.46	86.8	0.26	1.60	3.37	20.77
		GCA Box	1,048	2.06	1.08	14.93	7.83	4.77	2.50	0.75	0.39	11.10	5.82
		Interfacility	1,768	0.34	030	2.46	2,18	0.79	0.70	0.12	0.11	1.83	1.62
	F-14B/D	Full LTO w/ hot ref.	1,728	4.25	3.67	18.79	16.24	18.87	16.30	0.95	0.82	16.67	14.40
		Full LTO w/o hot ref.	5,185	5.53	14.34	92.61	51.23	24.70	64.02	1.14	2.96	21.02	54.48
		Touch&Go	7,979	0.32	[29	12.83	51.17	69.0	2.75	0.37	1.47	3.64	14.54
	1	GCA Box	586	81.1	0.35	10.88	3.19	2.04	09:0	29.0	0.20	7.59	2.22
	:	Interfacility	1,269	0.19	0.12	1.79	1.14	0.34	0.21	0.11	0.07	1.25	0.79
												:	
	A-6	Full LTO w/ hot ref.	545	31.18	8.50	3.81	101	47.97	13.08	0.53	0.15	00.00	00.0
		Full LTO w/o hot ref.	1,636	29.27	23.95	3.72	3.05	45.08	36.88	0.51	0.42	00.00	00.0
		Touch&Go	2,666	0.39	0.52	68.1	2.53	2.35	3.14	0.14	0.19	00.00	00.00
		GCA Box	381	1.28	0.24	4.71	06.0	7.84	1.49	0.40	0.08	00.0	00.00
		Interfacility	379	0.21	0.04	0.78	0.15	1.29	0.24	0.07	10.0	00.00	0.00
	# # # # # # # # # # # # # # # # # # #												
	F/A-18	Full LTO w/ hot ref.	421	28.36	5.98	8.39	1.77	75.74	15.96	0.46	0.10	7.38	1.56
	:	Full LIO w/o hot ret.	1,264	29.57	18.69	8.46	5.35	78.62	49.70	0.47	0.30	7.64	4.83
	:	Touch&Go	2,598	0.20	0.26	6.04	7.85	0.79	1.03	0.20	0.26	2.62	3.4
		Eull I TO m/ hot raf	Y6Y	8	110		760	30.73	56.		100	, c	
	<u> </u>	End To wo hot ref	484	100		10:1	010	10 73	1.33	0.21	0.03	1.33	0.32
		Touch&Go	943	0.14	200	81.0	3 2	1 80	28.5	0.03	0.0	0.75	0.23
		GCA Box	367	0.30	0.06	0.39	0.07	3.86	0.71	0.06	100	0.79	0.14
										:	:		
	UH-3H	Full LTO w/o hot ref.	0	8.84	000	0.71	0.00	13.94	0.00	0.13	00.00	00.00	0.00
	<u>C-12</u>	Full LTO w/o hot ref	1.669	13.79	11.51	0.73	190	1612	13.45	) i	000	, ,	
		Touch&Go	2,721	1.25	1.69	0.49	0.67	2.02	2.75	0.03	90.0	000	
		GCA Box	1,100	1.55	0.85	0.32	6.17	2.38	1.31	0.04	0.02	0.00	00.00
,	T-34	Full LTO w/o hot ref	1.040	126	0.66	0.14	M0	171	0.89	0.00	0.01	000	000
	=			スラースの名が、一般に一般についているか	Action to the Party of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Action of the Act							20.5	

ARS 3 RCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	0.0	Total per	55.80	71.12	1.46		0.79		18.87		69.0	2.04	0.34 0.32	-	78.62	7.85 0.79 1.03	30.33	0.19 19.23 4.65	1.80	3.86 0.71	16.12	2.02	2.38 1.31		0.07
ARS 3 AIRCRAFT EMISSIONS AT NAS 0 FOR 1993 AND 1996-1999	5	Total per		134.18	4.06	01'1	0.34 0.31 2.46		5.48	5.53	1.92	0.52	6/1 018 019	28.36 5.98 8.19	18.69	0.20 0.26 6.04	1.18	3.06 0.74 0.80	0.07		11,51		1.55 0.85 0.32		0.56
	Operation Number of	Operations/Year per operation (ID)	Full LTO w/ hot ref. 2,457	Full LTO w/o hot ref. 7,371			Interfacility 1,806	F. 11 T. 7	-	t ref.	-		Interfacility 1,894	Full LTO w/ hot ref. 421	Full LTO w/o hot ref. 1,264	Touch&Go 2,598	•	t ref.	:	GCA Box 367	Full LTO w/o hot ref. 1,669		GCA Box 1,100	:	Full L1O W/o not ret. 1,040

Particle   Operation   Number of   Operation   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color					¥	IRCRAFT E FOR	FT EMISSIONS AT NAS ( FOR 1993 AND 1996-1999	AIRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	SANA					
Alternolf		Type of	Operation	Number of	204		N.	7.	02		SO:	1		
F-14A   Pull LTO Wo bioi ref   1,728   2,74   2,296   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000   1,000		Aircraft		Operations/Year	per operation	Total (TPY)	per operation (1b)	MAYET	per operation (Ib)	Total (TPY)	per operation (1b)	Total (TPY)	per operation (Ib)	Total (TPY)
Full LTO wicker   5183   5541   5435   5638   5742   7112   18430   L111   288   1201     Trackleted   10,082   2054   10,22   246   135   135   0.15   0.15   0.15   0.15     Trackleted   10,082   2054   10,22   246   135   0.15   0.15   0.15   0.15   0.15   0.15     Institution   1,288   0.34   0.22   246   1.59   0.79   0.51   0.12   0.08   1.18     First   First   1,288   0.34   0.22   2.46   1.35   0.79   0.51   0.12   0.08   1.18     First   10,00 wicked   1,289   0.24   0.25   0.25   0.79   0.05   0.05   0.05     First   10,00 wicked   1,289   0.25   0.25   0.25   0.24   0.05   0.05   0.05     First   10,00 wicked   1,280   2.24   0.25   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   2.24   0.25   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   2.24   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.20   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.20   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.20   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,280   0.20   0.05   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,00   1.25   0.05   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,00   1.25   0.05   0.05   0.05   0.05   0.05   0.05   0.05     First   10,00 wicked   1,00   1.25   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05	QX	F-14A	Full LTO w/ hot ref.	1.728	27.74	23.96	69.6	8.37	55.80	48.20	0.96	0.83	9.54	8.24
Touch&Go         10,082         0.65         13.5         6,000         50.24         1.46         7.35         0.26         1.31         337           GCAA Box         1,032         2,036         1.06         1.032         2,046         1.77         2.46         0.78         0.99         11.10           Interfacility         1,288         0.33         2,246         1.58         0.99         0.31         0.00         1.31         1.87         2.46         0.79         0.81         1.10         0.02         1.11         0.02         1.11         0.02         1.11         0.02         1.11         0.02         1.11         0.02         1.11         0.02         0.03         0.05         1.13         1.10         1.13         1.13         1.13         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00			Full LTO w/o hot ref.	5,183	36.41	94.36	10.58	27.42	71.12	184.30	1.11	2.88	12.01	31.1
Total Live with fair fair live live live live live live live live			Touch&Go	10,082	0.65	3.25	90'9	30.24	1.46	7.35	0.26	1.31	3.37	591
Hinerfacility   1,288   0,344   0,222   2,454   1559   0,159   0,151   0,12   0,08   1,83     Full LTO w/ hot ref.   2,765   4,25   2,537   18.79   2,557   11,4   4.74   2,102     Full LTO w/ hot ref.   8,294   5,33   2,253   19.76   81,95   24,70   10,242   11,4   4.74   2,102     Full LTO w/ hot ref.   8,294   5,33   2,253   19.76   81,95   24,70   10,242   11,4   4.74   2,102     Full LTO w/ hot ref.   4,536   2,836   6,547   8,39   19,44   75,74   175,58   0,67   0,11   125     Full LTO w/ hot ref.   13,008   2,836   6,547   8,39   19,44   75,74   175,58   0,45   0,11   125     Full LTO w/ hot ref.   13,008   2,836   0,49   0,41   1,92   0,43   0,10   0,12     Full LTO w/ hot ref.   1,569   1,18   1,18   1,01   0,24   0,34   0,13   0,10   0,12     Full LTO w/ hot ref.   1,669   1,179   1,131   0,73   0,13   0,13   0,14   0,14     Full LTO w/ hot ref.   1,669   1,179   1,131   0,73   0,05   0,00     Full LTO w/ hot ref.   1,669   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,669   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,13   0,00   0,00     Full LTO w/ hot ref.   1,660   1,179   1,131   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,13   0,1			GCA Box	1,032	2.06	1.06	14.93	7.1	4.77	2.46	0.75	0.39		5.7
Full LTO w/ hoi ref.         2,765         4,25         5,87         18.79         25.57         18.87         26.08         0.95         132         16.7           Full LTO w/ hoi ref.         8,294         5,33         22,34         19.76         81.35         24.70         102.42         11.14         4.74         21.02           Full LTO w/ hoi ref.         12,689         0.35         12.83         81.38         0.69         4.37         0.37         23.4         3.64           IncheRolicy         2,033         0.118         0.55         1.83         0.69         4.37         0.37         23.4         3.64           IncheRolicy         2,033         0.118         0.55         8.45         5.04         0.37         0.46         1.07         7.38           Full LTO w/ hoi ref         1,3968         2,836         6.65.73         8.39         10.44         75.74         175.58         0.46         1.07         7.38           Full LTO w/ hoi ref         1,3968         2,837         0.20         2.88         6.04         8.83         1.07         7.38         7.64         1.75         1.45         1.45         1.45         1.45         1.18         0.05         0.13         0			Interfacility	1,288	0.34	0.22	2.46	1.59	0.79	0.51	0.12	0.08	1.83	_
Full LTO w/hot ref. 2,765 4,225 5,87 18.79 18.87 26.04 13.2 10.09 10.09 1.32 10.00 10.09 1.32 10.00 10.09 1.32 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.									i i	20.00	N. IC		. 12 21	, , , , , , , , , , , , , , , , , , ,
Full LTO w/ hot ref.         1.564         0.32         2.25         1.27         0.14         0.14         0.17         2.34         3.64           GCA Box         907         1.18         0.34         10.88         4.93         2.04         0.92         0.67         0.30         7.59           GCA Box         907         1.18         0.24         10.88         4.93         2.04         0.92         0.67         0.30         7.59           Interfacility         2.033         0.19         0.20         1.19         1.82         0.04         0.92         0.67         0.30         7.59           Full LTO w/n hot ref.         1.368         28.36         65.73         8.46         58.84         78.62         546.71         0.47         3.28         7.64           Full LTO w/n hot ref.         1.3508         20.37         20.563         8.46         58.84         78.62         546.71         0.47         3.28         7.64           Full LTO w/n hot ref.         1.344         4.89         1.18         1.01         0.20         2.81         0.05         0.18         0.07         0.18         0.07         0.18         0.09         0.01         0.01         0.01         0.01		F-14B/D	Full LTO w/ hot ref.	2,765	4.25	5.87	18.79	25.97	18.87	20.02	0.95	72.1	71.05	23.
GCA Box         907         118         0.54         10.88         4.93         2.04         0.92         0.67         0.30         7.59           Interfacility         2.033         0.19         0.20         1.79         1.82         0.34         0.14         0.11         0.11         1.25           Full LTO w/n for ref.         4.536         28.34         6.573         8.46         58.84         75.74         175.58         0.46         107         7.38           Full LTO w/n for ref.         4.586         0.20         2.884         78.62         546.71         0.47         3.28         7.54           Full LTO w/n for ref.         13.908         2.957         2.05.63         8.46         58.84         78.62         546.71         0.47         1.54           Full LTO w/n for ref.         2.875         0.20         2.88         6.04         86.32         0.79         11.32         0.20         2.81         5.59           Full LTO w/n for ref.         4.84         4.89         1.18         1.01         0.24         30.33         7.33         0.20         3.85         0.13         0.07         0.13         0.07         0.13         0.07         0.13         0.07         0.13<			Full L I O W/o not ref.	8,294	0.33	2.05	12.83	8138	69.0	437	0.37	2.34	3.64	23.12
High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High   High			GCA Box	907	81.1	0.54	10.88	4.93	2.04	0.92	19:0	0.30	7.59	3.4
Full LTO w/ hot ref.         4,636         28.36         65.73         8.39         19,44         75.74         175.58         0.46         1.07         7.38           Full LTO w/o hot ref.         1,308         28.36         65.73         8.46         58.84         0.79         11.32         0.20         281         2.62           Full LTO w/o hot ref.         28.57         0.20         2.88         6.04         86.32         0.79         11.32         0.20         2.81         5.62           GCA Box         856         0.48         0.20         3.64         86.32         0.79         11.32         0.20         2.81         5.52           InierTacility         2.484         0.020         0.11         2.80         3.87         0.73         0.18         0.18         0.19         0.18         0.10         0.11         1.45         0.18         0.19         0.13         0.11         0.05         0.18         0.05         0.13         0.04         0.93         0.04         0.93         0.04         0.93         0.04         0.93         0.04         0.93         0.04         0.93         0.04         0.05         0.04         0.05         0.05         0.01         0.05 <t< td=""><td></td><td></td><td>Interfacility</td><td>2,033</td><td>61.0</td><td>0.20</td><td>1.79</td><td>1.82</td><td>0.34</td><td>0.34</td><td>0.11</td><td>0.11</td><td>1.25</td><td>1.2</td></t<>			Interfacility	2,033	61.0	0.20	1.79	1.82	0.34	0.34	0.11	0.11	1.25	1.2
Full LTO w/ hoi ref.         4,636         28.36         65.73         8.39         19.44         75.74         175.58         0.46         1.07         7.38           Full LTO w/o hoi ref.         13,908         29.57         205.63         8.46         58.84         78.62         546.71         0.47         3.28         7.64           Full LTO w/o hoi ref.         13,908         29.57         205.63         6.04         86.32         0.79         11.32         0.20         2.81         7.64           Full LTO w/hoi ref.         28.56         0.48         0.20         9.04         86.32         0.79         0.11         1.45           Full LTO w/hoi ref.         484         4.89         1.18         1.01         0.24         36.33         7.33         0.21         0.05         1.45           Full LTO w/hoi ref.         484         3.05         0.74         0.80         0.19         19.23         4.65         0.13         0.03         0.01         0.03         0.03         0.01         0.03         0.03         0.01         0.03         0.01         0.03         0.01         0.03         0.01         0.03         0.01         0.03         0.01         0.03         0.01         0.03		:												
Full LTO w/o hoi ref.         13,908         29,57         205,63         846         58,84         78 62         546,71         0.47         3.28         764           Touch&Go         28,579         0.20         2,08         6,04         86,32         0.79         11,132         0.20         2,81         2,62           GCA Box         836         0.48         0,20         9,04         3,87         1,92         0,82         0,43         0,18         6,59           Interfacility         2,484         0.09         0,11         2,80         3,48         0,28         0,19         0,19         0,10         0,11         0,14         0,14         0,14         0,14         0,24         30,33         7,33         0,10         0,13         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45         1,45 </td <td></td> <td>F/A-T8</td> <td>Full LTO w/ hot ref.</td> <td>4,636</td> <td>28.36</td> <td>65.73</td> <td>8.39</td> <td>19.44</td> <td>75.74</td> <td>175.58</td> <td>0.46</td> <td>1.07</td> <td>7.38</td> <td>17.</td>		F/A-T8	Full LTO w/ hot ref.	4,636	28.36	65.73	8.39	19.44	75.74	175.58	0.46	1.07	7.38	17.
Touch&Go         28,579         0.20         2.88         6.04         86.32         0.79         11.32         0.20         2.81         2.62           GCA Box         85.6         0.48         0.20         9.04         3.87         1.92         0.82         0.43         0.18         6.59           GCA Box         85.6         0.48         0.20         9.04         3.87         1.92         0.82         0.43         0.12         1.45           Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.35           Full LTO w/o hot ref.         484         3.06         0.74         0.89         0.09         1.83         0.73         0.03         0.01         0.93           Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.05         0.01         0.79         0.79           Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.66         0.71         0.05         0.00         0.79           GCA Box         1,100         1.55         0.65         0.17         2.02         2.75         0.05			Full LTO w/o hot ref.	13,908	29.57	205.63	8.46	58.84	78.62	546.71	0.47	3.28	7.64	53.13
GCA Box         856         0.48         0.20         9.04         3.87         1.92         0.82         0.43         0.18         6.59           Interfacility         2,484         0.09         0.11         2.80         3.48         0.28         0.34         0.10         0.12         1.45           Full LTO w/o hoiref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hoiref.         484         3.05         0.74         0.80         0.19         19.23         4.65         0.13         0.04         0.93           Full LTO w/o hoi ref.         484         3.05         0.74         0.80         0.19         19.23         4.65         0.13         0.04         0.93           Full LTO w/o hoi ref.         1,669         13.79         11.51         0.73         0.07         3.86         0.71         0.06         0.09         0.00           Full LTO w/o hoi ref.         1,669         13.79         11.51         0.49         0.67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,100         1.55         0.49         0.6			Touch&Go	28,579	0.20	2.88	6.04	86.32	0.79	11.32	0.20	2.81	2.62	37.
Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/ hot ref.         484         3.96         0.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         3.96         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.07         3.86         0.71         0.06         0.01         0.79           GCA Box         1,100         1.35         0.73         0.73         0.67         2.02         2.75         0.06         0.00           Full LTO w/o hot ref.         1,040         1.26         0.49         0.67         2.02         2.75         0.05         0.00           GCA Box         1,100         1.26         0.66         0.14         0.67         2.02         2.75         0.05         0.00           Full LTO w/o hot ref.         1,040         0.26         0.14         0.07         1.71         0.89         0.02			GCA Box	856	0.48	0.20	9.04	3.87	1.92	0.82	0.43	0.18	6.59	2.82
Full LTO w/ hot ref.         484         489         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Go         943         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01         0.37           GCA Box         3.67         0.36         0.39         0.07         3.86         0.71         0.06         0.01         0.79           Full LTO w/o hot ref.         1,669         1.379         11.51         0.73         0.67         2.02         2.75         0.05         0.09           Touch&Go         2,721         1.25         1.69         0.49         0.67         2.02         2.75         0.05         0.06           GCA Box         1,100         1.55         0.85         0.34         0.07         2.02         2.75         0.05         0.00           Full LTO w/o hot ref.         1,040         1.26         0.04         0.04         0.07         0.07         0.09         0.00 <td></td> <td>:</td> <td>Interfacility</td> <td>2,484</td> <td>60'0</td> <td>0.11</td> <td>2.80</td> <td>3.48</td> <td>0.28</td> <td>0.34</td> <td>0.10</td> <td>0.12</td> <td>1.45</td> <td><del>-</del></td>		:	Interfacility	2,484	60'0	0.11	2.80	3.48	0.28	0.34	0.10	0.12	1.45	<del>-</del>
Full LTO w/ hoi ref.         484         489         1.18         1.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hoi ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Go         943         0.14         0.07         0.06         0.39         1.80         0.85         0.01         0.01         0.37           GCA Box         3.67         0.36         0.06         0.39         0.07         3.86         0.71         0.06         0.01         0.79           Full LTO w/o hoi ref.         1.669         1.57         0.73         0.66         0.01         0.09         0.00           GCA Box         1.100         1.55         0.85         0.34         0.67         2.02         2.75         0.05         0.00           Full LTO w/o hoi ref.         1.040         1.26         0.06         0.14         0.07         0.07         0.07         0.00         0.00							2			11 11	) 	1	14 14	
Full LTO w/o hot ref         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Go         943         0.14         0.07         0.18         0.09         1.80         0.85         0.01         0.01         0.37           GCA Box         3.67         0.36         0.06         0.39         0.07         3.86         0.71         0.06         0.01         0.79           Full LTO w/o hot ref         1,669         1.379         11.51         0.73         0.61         1.345         0.11         0.09         0.00           GCA Box         1,100         1.55         0.85         0.32         0.17         2.38         1.31         0.04         0.00           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00		S-3	Full LTO w/ hot ref.	484	4.89	1.18	1.01	0.24	30.33	7.33	0.21	0.05	1.33	0
Touch&Go         943         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01         0.37           GCA Box         367         0.06         0.39         0.07         3.86         0.71         0.06         0.01         0.79           Full LTO w/o hoi ref         1,669         13.79         11.51         0.73         0.61         16.12         13.45         0.11         0.09         0.00           Touch&Go         2,721         1.25         1.69         0.49         0.67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,100         1.55         0.85         0.34         0.07         1.71         0.89         0.02         0.00           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00			Full LTO w/o hot ref.	484	3.06	0.74	0.80	0.19	19.23	4.65	0.15	0.04	0.93	0.23
GCA Box         367         0.36         0.39         0.071         0.06         0.01         0.79           Full LTO w/o hot ref.         1,669         13.79         11.51         0.73         0.61         16.12         13.43         0.11         0.09         0.00           Touch&GO         2,721         1.25         1.69         0.49         0.67         2.02         2.75         0.03         0.06         0.00           GCA Box         1,100         1.55         0.85         0.32         0.17         2.38         1.31         0.04         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.00         0.00			Touch&Go	943	0.14	200	81.0	0.09	08.1	0.85	0.03	0.01	0.37	<u></u>
Full LTO w/o hoi ref         1,669         13.79         11.51         0.73         0.61         16.12         13.45         0.11         0.09         0.00           Touch&Go         2,721         1.25         1.69         0.49         0.67         2.02         2.75         0.05         0.06         0.00           GCA Box         1,100         1.55         0.85         0.32         0.14         0.09         0.00         0.00           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01			GCA Box	367	0:30	90.0	0.39	0.07	3.86	0.71	90.0	0.01	0.79	0
Full LTO w/o hat ref.         1,669         13.79         11.31         0.73         0.01         10.12         0.05         0.05         0.00           Touch&Go         2,721         1,25         1,69         0,49         0,67         2,02         2,75         0,05         0,00           GCA Box         1,100         1,55         0,85         0,32         0,17         2,38         1,31         0,04         0,00           Full LTO w/o hat ref.         1,040         1,26         0,66         0,14         0,07         1,71         0,89         0,02         0,01			Marie Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the	le in p				***	i N	27 10 1		i,	9	-
Touch&Go 2,721 1.25 1.69 0.49 0.67 2.02 2.75 0.05 0.06 0.00 0.00 0.00 0.00 0.00 0.0		C-12	Full LTO w/o hot ref.	1,669	13.79	16.11	0.73	0.01	71.01	13.45	- 0	0.09	0.00	00.0
GCA Box 1,100 1.55 0.85 0.32 0.17 2.38 1.31 0.04 0.02 0.00 0.00			Touch&Go	2,721	1.25	169	0,49	0.67	2.02	2.75	0.05	0.06	0.00	00.0
Full LTO w/o hot ref.         1,040         1,26         0.14         0.07         1.71         0.89         0.02         0.01         0.00			GCA Box	1,100	1.55	0.85	0.32	0.17	2.38	1.31	0.04	0.05	0.00	0.0
Full LIO W/o hat re: 1,040 [1.25] U.14 [1.07] 1.17 [1.05] U.0.0				ic C					IT	000	200	100	, O	Ď Ď
		T-34	Full LTO w/o hot ref.	1,040	1,26	0.00	0.14 1	0.07	1./1	0.89	0.02	10.0	0.00	214 61

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Table F-18

				FOR 1993 AND 1996-1999		1 OK 1225 AIND 1330-1339							
	Aircraft	Operation	Number of		F	NOX	16.2	<u>ت</u>	0.3	S	<u>S02</u>		PINTIN
			Operations/Year per	per operation	Total	per operation	Total	per operation	Total	per operation	Total	per operation	Total
6661	F-14A	Fill I'IO w/ hot ref	966.1	(a)	(IAI)	(a)	(TPY)	(P)	(TPY)	<b>e</b>	(TPY)	(Q)	(TPY)
		Eull TO wo has raf	1,720	*,,,,	23,30	9.69	8.37	55.80	48.20	0.96	0.83	9.54	8.74
	-	Tour e. C.	3,183	56.4	94.36	10.58	27.42	71.12	184.30	11.1	2.88	12.01	71 IL
		1 Ouch&Go	780,01	0.65	3.25	0.9	30.24	1.46	7.35	0.26	131	117	12.00
		GCA BOX	1,032	2.06	. 1.06	14.93	7.71	4.77	2.46	0.75	0.39	11.10	5.73
		Interfacility	1,288	0.34	0.22	2.46	1.59	0.79	0.51	0.12	0.08	83	2.7
	F-14R/D	Eull TO/ hot not	4 726										
		Full I TO w/o hot raf	6.707	4.25	5.87	18.79	25.97	18.87	26.08	0.95	1.32	16.67	23.04
		Touch B.C.	0,294	2.23	22.93	19.76	81.95	24.70	102.42	T.14	4.74	21.02	87.15
		TOURING CO	12,069	76.0	2.05	12.83	81.38	69.0	4.37	0.37	2.34	3.64	23.12
		Trion Dox	30/	81.1	.0.54	10.88	4.93	2.04	0.92	79.0	0.30	7.59	144
		Internacionty	2,033	6.19	0.20	6.1	1.82	0.34	0.34	0.11	0.11	1.25	1.27
	F/A-18	Full I TO w/ hot ref	2.770	31.01									
-		Full I TO w/o hot raf	16 437	06.92	60//	8.39	22.97	75.74	207.30	0.46	1.26	7.38	20.22
		Touch P.C.	10,43/	7000	243.02	8.46	69.54	78.62	646.11	0.47	3.88	7.64	62.69
		TOUGHOUS CO	53,77	070	3.40	6.04	102.01	0.79	13.38	0.20	3.32	2.62	44 33
	: : : : : : : : : : : : : : : : : : : :	List State	210,1	0.48	0.24	9.04	(.3)	1.92	0.97	0.43	0.22	6 20	1 11
	:	menaciniy	2,936	0.09	0.13	2.80	4.12	0.28	0.41	0.10	0.14	1.45	7.13
	6.1	Enil I TO m/ hot ref	101									1	
		Enli TO W/ not ret.	484	80.	1.18	101	0.24	30.33	7.33	0.21	0.05	1.33	Ct U
		run LiO W/0 not ret.	484	3,06	0.74	0.80	0.19	19.23	4.65	0.15	0.04	0.93	0.73
		I Outch & Co	943	0.14	0.07	0.18	60'0	1.80	0.85	0.03	0.01	0.37	0.17
	1	CCA B0X	/95	0.30	90.0	0.39	0.07	3.86	0.71	0.06	0.01	6.79	0 14
-	C-12	Full I TO w/o bot ref	1,550	***					:		:	i	
		Touch&Go	1.6.6	13.72	72.1	0.73	0.61	16.12	13.45	0.11	0.09	00.0	00.00
		CCA Box	17/7	27	69.1	0.49	0.67	2.02	2.75	0.05	0.06	0.00	000
			001.	C1	0.85	0.32	0.17	2.38	1.31	0.04	0.02	00.00	0.00
	T-34	Full LTO w/o hot ref.	1.040	1.26	990	<b>F10</b>	400		10	, j	: !		
	Total		114,446		495,68		196.91	<del></del>	0.89	0.02	10.0	0.00	0.00
							2		27.//71		23.42		334.94

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) Number of GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at Oceana.

1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.

(3) 1993 Full LTO and Touch and Go NASO proportioned from air traffic operation records.

(4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997). (5) A-6 aircraft assumed decommissioned by 1997.

(6) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997). (7) Aircraft VOC reported as HC in the form CHy/x

(9) LTOs for GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G. (8) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds PM10 = particulate matter NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide

Key:

LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach

spunod = q

TPY = tons per year

	PM10	n Total	(TPY)	17.70	11	13.17		0.00	0.00		0.00	30.87		22.10	16 91		00.0	0.00		0.00	39.01		22.58	:6	47.67	0.00	00.0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
		per operation	(lb)	3.37		3.64	0	0.00	0.00	10	0.00	-	1	3.37	3.64	:	00.00	0.00		0.00		;	3.37		3.04	0.00	00.0	
	7	Total	(TPY)	1.37		1.33		0.28	3.04		0.79	6.81		1.70	1.71		0.00	2.49		0.13	6.03		1.74	14	2.55	0.00	2.59	
	802	per operation	(lb)	0.26		0.37		0.52	0.24	10	0.14			0.26	0.37		0.52	0.24		0.14			0.26	: : : : : : : : : : : : : : : : : : : :	0.37	0.52	0.24	
		Total	(TPY)	7.66		2.49		8.51	5.29		13.05	37.00		9.56	3 10		0.00	4.32	1	2.12	19.20		6.77		4.77	000	4.51	
RESS	02	per operation	(g.)	1.46		69.0		15.85	0.42		2.35			1.46	0.80	60.0	15.85	0.42		2.35			1.46		69.0	15.85	0.42	
Table F-19 ARS 3 AIRCRAFT EMISSIONS AT NALF FENTRESS FOD 1003 AND 1906,1999		Total		31.53		46.34		3.38	54.89		10.50	146.63		39.36	50 50	30.00	0.00	44.85		171	145.45		40.21		88.85	100	46.82	
Table F-19 ARS 3 FEMISSIONS AT NALF 1 FOD 1993 AND 1996,1999	XON	per operation	a)	90'9		12.83		6.29	4.38		1.89			6.00	10.07	20.71	6.29	4.38		1.89			6.00		12.83	4.20	4.38	
AIRCRAFT	9	Total	Carr	3.39		1.17		\$.40	1.37		2.16	13.48		4.23	V2	) NCII	000	112		0.35	7.20		4.32		2.24	000	1.17	· · · · · · · · · · · · · · · · · · ·
	NOC (	per operation	<b>_</b>	99'0		0.32		10.05	0.11		039			59.0	2,0	0.32	10.05	110		0.39			0.65		0.32	10.05	110	
	Number of	Œ		10,311		7,226		1,074	25,058		11,086	54,955		13,124		197'6	0	20.478		1,805	44,687		13,406		13,854		21 374	
	Operation	Type		Touch&Go		Touch&Go		Full LTO	Touch&Go	1	Touch&Go			Touch&Go		1 ouch&Go	Enli TO	ToucherGo	One in the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the interest of the int	Touch&Go			Touch&Go		Touch&Go	0.11.170	Touch&Go	2000
	Type of	Aircraft		F-14A		F-14B/D		E-2/C-2			9-Y	Total		F-14A		F-14B/D	E-2/C-2	7-0/7-0		Y-6	Total		F-14A	:	F-14B/D	c Cic	E-2/C-2	_
				1993	<del></del>	<u>:</u>				<u> </u>	<u>-</u>			9661	<del>-</del>			•		-		:	1661					

				10	Total	(TPY)	16.48	27.08		24.17	00 0	00.0	0.00	67.73	:	16.48	27.08		28.56		00.00	0.00	77 17
				PM10	per operation	<u>ê</u>	3.37	3.64		2.62	 000	00.0	00.0			3.37	3.64		2.62		0.00	0.00	
				2	Total	(TPY)	1.27	2.74		1.81	0.00	03.0	65.7	8.41		1.27	 2.74		2.14		00.0	2.59	77
				802	per operation	<b>(9</b> )	0.26	0.37		0.20	0.52	PC 0	47.0			0.26	0.37		0.20		0.52	0.24	
7					Total	(TPY)	7.13	5.12		7.30	0.00	1 51	4.31	24.05		7.13	5.12		8.62		0.00	4.51	25 38
		RESS		00	per operation	æ	1.46	69.0		0.79	15.85	0.42	74.0			1.46	69.0		0.79		15.85	0.42	
6		AIRCRAFT EMISSIONS AT NALF FENTRESS	6661-9661	C3300	Total	SE SE	29.35	95.33		55.62	0.00	46.87	700	227.12		29.35	95.33		65.74		00:0	46.82	237.23
Table F-19	ARS 3	EMISSIONS A	FOR 1993 AND 1996-1999	YON	per operation	_ @	90'9	12.83		6.04	6.29	4 38	2			9.00	12.83		6.04		6.29	4.38	
		AIRCRAFT				(TPY)	3.16	2,40		98.1	0.00	117		8.58		3.16	2.40		2.19		0.00	1.17	8.92
				(e) (o)	per operation	(II)	9.65	0.32		0.20	10.05	0.11	*** ** ** *** *** *** *** *** *** ***			0.65	0.32		0.20		10.05	0.11	
				av 1	perations/Yea	3128	9,784	14,865		18,416	0	21.374	017 77	04,439		9,784	14,865		21,764	-2-2	0	21,374	67,787
				Operation	Type		Touch&Go	Touch&Go		Touch&Go	Full LTO	Touch&Go				Touch&Go	Touch&Go		Touch&Go		Full LTO	Touch&Go	
			*	lype of	Aircraft		F-14A	F-14B/D		F/A-18	E-2/C-2	1	Total			F-14A	F-14B/D		F/A-18		E-2/C-2		Total
							8661		-	<u> </u>	<u>L</u>	<u> </u>				1999	 			1			
			_[_					 		-		-					 T-1	-4					_

Notes:

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) 1993 Touch and Go proportioned from air traffic operation records and number of interfacility flights.

(3) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).

(4) A-6 aircraft assumed decommissioned by 1997.

1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997). 1996 and 1998 E-2/C-2 operations assumed same as 1999.
 Aircraft VOC reported as HC in the form CHy/x
 Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen SO2 = sulfur dioxide PM10 = particulate matter CO = carbon monoxide

interfacility = low altitude operations between NAS Oceana and NALF Fentress LTO = landing and takeoff cycle GCA = ground control approach

spunod = qı

TPY = tons per year



									,		
		<b>3</b> 0	٠	Š	*	03	0	SOS	)2	M.	PM-10
	Fuel Consumption (gal/yr)	15/1000 gall	Total (TPY)	16/1000 gal	Total (YPT)	lb/1000 gai	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1993 Tow Tractors: (a)											-
A/S32A-30A	0968	64.60	0.29	436.67	1.96	268.50	1.20	31.10	0.14	46.50	0.21
TA-35	254	64.60	10.0	436.67	90.0	268.50	0.03	31.10	0.00	46.50	0.01
MD-3/A/S35A-31A	4843	64.60	0.16	436.67	1 06	268 50	0.65	31.10	0.08	46 50	<u> </u>
7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	17116	ON EX	20	42.00	28.1	225000	10.0	2.30	200	0.54	100
IA-/3	1/115	00.771	<b>5</b> .1	140.00	3:	3230.00	18.77	2.20	0.04	9.77	0.0
A/S32A-42	7200	64.60	0.23	436.67	1.57	268.50	0.97	31.10	0.11	46.50	0.17
JG-75	104	122.00	0.01	146.00	10.0	3250.00	0.17	5.20	00.0	8.27	0.00
A/S32A-30	168	122.00	0.03	146.00	0.07	3250.00	1.46	5.20	00.00	8.27	0.00
											1
Flight Line Electric Power Unit	S									:	!
<b>)</b>	14926	49.23	150	604.17	4.51	130.15	260	39.73	0.30	42.47	0.32
NCIUC (B)	3180	16.07	0.08	604 17	96.0	130 13	0.21	19.73	900	42.47	0.07
(2) 20 20				:					3	•	
Jet Engine Start Units											:
A7M47A-4/NCPP-103 76)	41912	40.71	103	604.17	12.67	130.15	273	39.73	0.83	42.47	0.89
A75274.176)	717	4071	QU U	60d 17	6.0	13015	0.05	10.71	100	45.47	000
(2) 100	וטוטו		W C	1 00	SU D	17.83	0.07	N 5.4	000	V 00	000
(5) (6-215	10101	2	3.3	000	40.0	7.07	2	5	3	8.	3
7.5										!	
Miscellaneous: (v)	2018	** **	2000	20.700		11001	Y 1 V	30.73	200	FK 61	700
A/M32C-1/	2102	49.23	S	7.4	4 6	130.15	0.14	39.73	9.0 K	42.47	0 8
A/M271-5	990	49.23	70.0	604.17	0.30	130.15	0.00	39.73	70.0	42.47	0.02
A/M42M-2	07/	49.25	70.0	004.17	0.22	130.15	0.05	39.73	0.01	42.47	0.02
HLU-196	8400	415.11	1. (4	15.622	# <b>\$</b>	8289.90	30.08	2.1	0.02	13.70	0.00
	lotai	75 24 24 25 25	3.13		70.43		C0.7/		1.7	_;	00.7
(a)				42.		X	R 8	×1-14	X	X .	×
A/S32A-30A	00061	04:00	0.01	430.07	4.15	768.30	2.33	31.10	0.30	40.30	0.44 × ×
TA-35	450	64.60	0.01	436.67	0.10	268.50	0.06	31.10	0.01	46.50	0.01
MD-3/A/S32A-31A	4843	9.4. 9.	0.16	456.67	8 1	768.50	0.65	31.10	0.08	46.50	0.1
TA-73 (MOGAS)	1600	122.00	0.10	146.00	0.12	3250.00	2.60	5.20	00.0	8.27	0.0
A/S32A-42	17000	64.60	0.55	436.67	3.71	268.50	2.28	31.10	0.26	46.50	0.40
JG-73	104	122.00	10.0	146.00	0.0	3250.00	0.17	5.20	00.00	8.27	0.00
A/S32A-30	2900	122.00	0.18	146.00	0.21	3250.00	4.71	5.20	0.01	8.27	0.01
	:				¥3.			:	:		:
Flight Line Electric Power Units	S	***	22		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				· <u>·</u>		
NC8A (6)	12800	49.23	0.32	604.17	3.87	130.15	0.83	39.73	0.25	42.47	0.2
NC10C(6)	3500	49.23	60.0	604.17	1.06	130.15	0.23	39.73	0.07	42.47	0.07
				***************************************		:			:		
Jet Engine Start Units										:	
A/M47A-4/NCPP-105 (b)	37000	49.23	160	604.17	11.18	130.15	2.41	39.73	0.74	42.47	0.79
GTC-85 (c)	3000	0.13	000	3.88	7 1	14.83	0.02	0.54	0.00	00.0	00.0
/_/								1			!
Miscellaneous: (b)											
A AA137C-17	0070	1007	0.08	K04.17	0.73	13015	0.16	10 71	0.05	72 CA	0.05
A MOTT & Cair acad	2350	70.73	200	2011	16.0	130.15	0.10	10 72	0.05	45.47	0.0
A MAJAK 2 Contact	0051	10.72	200	En. 19	117	130.15		30.73	0.00	12.47	0.0
TI II 100	35	415.11	E	12.866	000	8589 90	21.0	11 \$11	000	13.70	000
061-071	C.7			-	3		5				֡

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Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption   Consumption			X.	×	N	УK	υ	C	SC	7.7	PM.	01:
ASSIA-340   2000   64.00   0.71   436.07   438.90   268.50   259   3110   0.34   46.50     ASSIA-340   2000   64.00   0.21   436.07   0.32   336.00   3.69   3.10   0.01   8.50     ASSIA-340   2000   64.00   0.21   46.67   0.13   3.26.00   1.85   3.20   0.00   8.20     ASSIA-340   2000   64.00   0.74   46.67   0.13   3.26.00   1.85   3.20   0.00   8.20     ASSIA-341   2000   64.00   0.74   46.67   0.13   3.26.00   1.85   3.20   0.00   8.20     ASSIA-342   2000   49.22   0.13   0.00   1.28   1.01   3.00   0.13   0.00   0.20     AMAZIA-3   48.00   49.22   0.13   0.00   1.48   1.01   0.35   0.35   0.10   0.20     AMAZIA-3   1.60   49.22   1.11   0.0417   13.39   1.01   2.33   0.35   0.00   0.20     AMAZIA-3   1.60   49.22   0.13   0.00   0.44   0.00   0.00     AMAZIA-3   1.60   49.22   0.17   0.00   0.13   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.01   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.01   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.01   0.00   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.01   0.00   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.01   0.00   0.00   0.00     AMAZIA-3   1.60   49.22   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-4   1.60   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-3   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-4   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-4   0.00   49.22   0.00   0.00   0.00   0.00   0.00   0.00   0.00     AMAZIA-4   0.00   49.22   0.00   0.00   0.00   0.00   0.00     AMAZIA-4   0.00   49.22		Fuel Consumption (gal/yr)	lb/1000 gal	Total (TPY)	16/1000 gal		1b/1000 gai	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
ASSAA-34A 25000 64400 071 14560 158 2883 0 259 1110 0514 4530 ASSAA-34A 25000 64400 071 14560 011 25830 0 259 1110 051 4530 ASSAA-34	Tow Tractors:											
ASSLA-34 5500 122.00 0.021 146.00 0.23 3520 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.24.30 11.00 0.001 8.27 745.35 75.35 11.00 0.001 8.27 745.35 75.35 11.00 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 11.35 0.001 1	A/S32A-30A	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
Thight Line Electric Power Units   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   Cond.   C	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
TASTA-42   1200	TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
The Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property of the Property	A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
Flight Line Electric Power Units   16000	TA-75	1200	122.00	1:04	146.00	1.25	3250.00	1.95	5.20	0.00	8.27	0.00
NCGA   10   10   10   10   10   10   10   1	E. L. T. T. T. T. T. T. T. T. T. T. T. T. T.											
NCROP (b)   NCRA (b)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)   NCRA (c)	Flight Line Electric Power U		17.43	8	***	***		70.	000	0	100	io Io
Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Active   Color   Acti	NC8A (b)	10000	49.23	86.0	71.4	4.83	130.15	1.04	39.73	0.32	42.47	0.34
Jet Engine Start Units         Start And And And And Color         111         GOLIT         1359         13015         2.93         3973         0.89         42.47           GTC-85 (c)         Anda 47, An (Cope 105 (d)         3500         40.13         60.01         48.83         0.01         48.83         0.05         99.73         0.00         0.00           Miscellaneous: (b)         3000         49.23         0.07         604.17         0.93         130.15         0.20         39.73         0.06         42.47           AMAZAN-3         3000         49.23         0.07         604.17         0.39         130.15         0.20         39.73         0.06         42.47           AMAZAN-3         3000         49.23         0.07         604.17         0.39         130.15         0.10         42.47           AMAZAN-3         10.00         415.11         0.00         223.31         0.00         8589.90         0.09         11.71         0.00         42.47           AMAZAN-3         2.00         44.50         0.71         44.57         3.25         3.28.50         0.09         11.71         0.00         42.47           ANS2A-3A-30         2.00         64.60         0.71         43	NCIOC (6)	0000	49.23	CI'O	21.17	1.81	130.15	0.39	39.73	0.12	42.47	0.13
AMATALANCIP-105 (b)         49000         4923         111         66417         1355         13015         233         3573         689         4247           GTC-85 (c)         3500         0.15         0.00         388         0.01         1483         0.05         0.54         0.00         0.00           Miccellaneous: (b)         3000         49.23         0.07         604.17         0.91         13015         0.20         39.73         0.06         42.47           AMAZNA-2         3000         49.23         0.07         604.17         0.91         13015         0.20         39.73         0.06         42.47           AMAZNA-2         1600         49.23         0.04         604.17         0.91         13015         0.20         39.73         0.06         42.47           AMAZNA-3         1600         49.23         0.04         604.17         0.94         13015         0.00         39.73         0.06         42.47           AMAZNA-3         1600         49.23         0.04         24.34         45.01         13015         0.06         39.73         0.06         13.70           ANS3A-30A (MOCAS)         2500         64.60         0.74         436.67	Jet Engine Start Units											
Mixellaneous: (b)   3500   613   600   388   601   1483   0.03   0.54   0.00   0.00	A/M47A-4/NCPP-105 (b)	45000	49.23		604.17	13.59	130.15	2.93	39.73	0.89	42.47	0.96
Miscellaneous: (b)         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           ANA3ZC-17         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           ANA3ZU-18         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           ANA3ZU-18         3000         49.23         0.04         604.17         0.48         130.15         0.20         39.73         0.06         42.47           AN3ZU-18         200         49.23         0.04         604.17         0.48         130.15         0.10         39.73         0.06         42.47           AN3ZU-18         200         47.21         0.04         604.17         4.86         130.15         0.16         42.47           ANSZU-18         10.00         62.00         0.71         436.67         4.86         35.20         3.93         31.10         0.34         42.47           ANSZU-18         6.00         6.20         0.74         436.67         5.02         288.30         3.93	GTC-85 (c)	3500	0.13	00.0	3.88	0.01	14.83	0.03	0.54	0.00	00.00	0.00
AMAZELIA         AMAZELIA         AMAZELIA         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZELIA         AMAZELIA         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZELIA         1600         49.23         0.07         604.17         0.48         130.15         0.20         39.73         0.06         42.47           HUL1:165         20         415.11         0.04         624.17         0.48         130.15         0.10         39.73         0.06         42.47           HUL1:166         20         415.11         0.04         624.17         0.48         130.15         0.10         39.73         0.06         42.47           HUL1:166         20         415.11         0.04         223.31         0.04         43.50         131.00         0.34         45.50           AK332A-30         AMOGAS)         500         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.34         45.50           AK332A-30         AMOGAS)         500         64.60	K. II.											
AMAZIZ-17         3000         492.2         0.07         644,17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIZ-17         3000         492.23         0.07         604,17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIN-2         1600         492.23         0.04         604,17         0.09         8589.90         0.00         13.70         42.47           HUL196         7         7         46.00         223.31         0.00         8589.90         0.00         13.70         42.47           AS32A-30A (MOCAS)         22000         64.60         0.71         48.67         4.80         268.50         5.89         51.10         0.34         46.50           AS32A-30A (MOCAS)         22000         64.60         0.74         48.67         0.13         268.50         5.89         51.10         0.34         46.50           AS32A-30A (MOCAS)         23000         64.60         0.74         43.67         5.02         268.50         5.89         51.10         0.34         46.50           AS32A-30A (MOCAS)         23000         64.60         0.74         43.67         5.02	Miscellaneous: (b)	•										
AMAZIT-S         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           AMAZIT-S         3000         49.23         0.07         604.17         0.91         130.15         0.20         39.73         0.06         42.47           HUU-196         20         10         25.31         0.08         878.90         0.00         137.0         13.00           ANS3ZA-30         Total         45.7         2.00         0.21         46.00         0.26         2.50         0.01         46.50           ANS3ZA-30         MOGAS)         22000         64.60         0.71         436.67         5.02         2.88.50         5.20         0.01         46.50           ANS3ZA-30         MOGAS)         22000         64.60         0.74         436.67         5.02         2.88.50         5.20         0.01         46.50           ANS3ZA-30         ANS3ZA-30         40         35.00         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.34         42.47           NCBA (b)         Booton         49.23         0.39         604.17         4.83         <	A/M32C-17	3000	49.23	0.07	604.17	0.91	130.15	0.20	39.73	0.06	42.47	90.0
HUU-196	A/M27T-5	3000	49.23	0.07	604.17	0.91	130.15	0.20	39.73	90.0	42.47	90.0
HUU-196	A/M42M-2	0091	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
Town Tractions: (a)         Fount Tractions: (b)         10141         4.557         34.01         18.73         2.20           AS32A-30A (MOGAS)         22000         64.60         0.71         436.67         4.80         268.50         2.95         31.10         0.34         46.50           AS32A-30A (MOGAS)         22000         64.60         0.71         436.67         0.13         268.50         5.09         5.20         0.01         46.50           AS32A-30 (MOGAS)         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.31         46.50           AS32A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.31         46.50           AS32A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.31         46.50           AS32A-42         26.60         6.60         7.4         436.67         5.02         268.50         3.09         31.10         0.35         42.47           NCBA (b)         8000         49.23         0.20         604.17         2.42         130.15	HLU-196	20	415,11	0.00	223.31	0.00	8589.90	0.09	11.51	0.00	13.70	0.00
Cow Tractors: (g)         Low Tractors: (g)         Cow Tractors: (g)         AS32A-304 (MOGAS)         22000         64.66         0.71         436.67         4.80         268.50         2.95         31.10         0.34         46.50           AS32A-30         600         64.60         0.21         146.00         0.36         3250.00         5.69         5.20         0.01         8.27           AS32A-30         600         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.31         46.50           AS32A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.36         46.50           RAS3A-42         23000         64.60         0.74         436.67         5.02         268.50         3.09         31.10         0.36         46.50           RIGHAS         1.00         49.23         0.39         604.17         4.83         130.15         0.35         39.73         0.16         42.47           NC10C (b)         8000         49.23         0.16         604.17         2.42         130.15         30.73         0.53         42.47           GIC-85 (c)		Lotal		4:57		34.01		18.73		2.20	-	7.00
March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   March   Marc												
3500         122.00         0.21         146.00         0.26         3250.00         5.69         5.20         0.01         8.27           2 23000         64.60         0.02         436.67         5.02         268.50         0.08         31.10         0.01         46.50           Electric Power Units         16000         49.23         0.39         604.17         4.83         130.15         1.04         39.73         0.35         42.47           Start Units         NCPP-105 (b)         47000         49.23         0.20         604.17         2.42         130.15         0.52         39.73         0.35         42.47           NCPP-105 (b)         47000         49.23         0.16         604.17         1.22         130.15         0.52         39.73         0.05         42.47           Outs: (b)         4000         49.23         0.10         604.17         1.21         130.15         0.54         0.00         0.00           T         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           T         4000         49.23         0.10         604.17         1.21         130.15	A/S32A-30A (MOGAS)	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
Electric Power Units  Electric Power Units  MCPP-105 (b) 45.60 0.02 436.67 5.02 268.50 0.08 31.10 0.01 46.50 46.50 5.02 268.50 3.09 31.10 0.01 46.50 46.50 5.02 268.50 3.09 31.10 0.03 42.47 436.67 5.02 268.50 3.09 31.10 0.03 42.47 42.47 8000 49.23 0.20 604.17 2.42 130.15 0.52 39.73 0.32 42.47 600c.  MCPP-105 (b) 47000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47 7 4000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47 1.20 1600 49.23 0.04 604.17 1.21 130.15 0.26 39.73 0.08 42.47 1.20 1600 49.23 0.04 604.17 1.21 130.15 0.26 39.73 0.08 42.47 1.20 1600 49.22 0.04 604.17 1.21 130.15 0.10 39.73 0.08 42.47 1.20 1600 49.22 0.04 604.17 0.00 8589.90 0.09 11.51 0.00 13.70	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
Electric Power Units  Electric Power Units  Electric Power Units  Electric Power Units  Electric Power Units  Electric Power Units  Electric Power Units  Bood 49.23 0.39 604.17 2.42 130.15 0.52 39.73 0.16 42.47  NCPP-105 (b) 47000 49.23 1.16 604.17 14.20 130.15 3.06 39.73 0.93 42.47  NCPP-105 (b) 47000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47  4000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47  1 4000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47  2 1600 49.23 0.10 604.17 1.21 130.15 0.06 39.73 0.08 42.47  2 2 415.11 0.00 222.331 0.00 8589.90 0.09 11.51 0.00 13.70	TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.0
Electric Power Units    56000   49.23   0.39   604.17   4.83   130.15   1.04   39.73   0.32   42.47     16000   49.23   0.20   604.17   2.42   130.15   0.52   39.73   0.16   42.47     16000   49.23   1.16   604.17   14.20   130.15   3.06   39.73   0.09     16000   49.23   1.16   604.17   14.20   130.15   3.06   39.73   0.09     16000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     16000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     16000   49.23   0.04   604.17   1.21   130.15   0.05   39.73   0.08   42.47     16000   49.23   0.04   604.17   1.21   130.15   0.05   39.73   0.03   42.47     16000   49.23   0.04   604.17   1.21   130.15   0.05   39.73   0.03   42.47     16000   49.23   0.04   604.17   0.09   8589.90   0.09   11.51   0.00   13.70     16000   49.23   0.04   604.17   0.09   8589.90   0.09   11.51   0.00   13.70     11.70   1.50   1.50   0.09   11.51   0.00   13.70     11.70   1.50   1.50   0.09   11.51   0.00   13.70     11.70   1.50   1.50   0.00   11.50     11.70   1.50   0.00   11.50     11.70   1.50   0.00   0.00     11.70   1.50   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00   0.00   0.00     11.70   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0	A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
16000   49.23   0.39   604.17   4.83   130.15   1.04   39.73   0.32   42.47     8000   49.23   0.20   604.17   2.42   130.15   0.52   39.73   0.16   42.47     NCPP-105 (b)   47000   49.23   1.16   604.17   14.20   130.15   3.06   39.73   0.09   42.47     NCPP-105 (b)   4000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     4000   49.23   0.10   604.17   1.21   130.15   0.26   39.73   0.08   42.47     1600   49.23   0.04   604.17   1.21   130.15   0.10   39.73   0.03   42.47     1600   49.23   0.04   604.17   1.21   130.15   0.10   39.73   0.03   42.47     1600   49.23   0.04   604.17   0.09   8389.90   0.09   11.51   0.00   13.70     1600   49.23   0.04   604.17   0.00   8389.90   0.09   11.51   0.00   13.70     170	Flight Line Electric Power U	Inits								· ! .		
1000	TO VICE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF T	00021	40.00	0,0	20117	7 02	11011	1	100		17	
Start Units         At 7000         49.23         1.16         604.17         14.20         130.15         3.06         39.73         0.93         42.47           0 cous: (b)         3500         0.13         0.00         3.88         0.01         14.83         0.03         0.54         0.00         0.00           0 cous: (b)         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         1600         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           2         2         0.04         40.00         223.31         0.09         8589.90         0.09         11.51         0.00         13.70	NC10C (6)	8000	49.23	0.20	604.17	2:42	130.15	0.52	39.73	0.16	42.47	0.17
ACPP-105 (b)         47000         49.23         1.16         604.17         14.20         130.15         3.06         39.73         0.93         42.47           0us: (b)         3500         0.13         0.00         3.88         0.01         14.83         0.03         0.54         0.00         0.00           7         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           2         20         415.11         0.00         223.31         0.00         8589.90         0.09         11.51         0.00         13.70	Jet Engine Start Units											
013         0.00         3.88         0.01         14.83         0.03         0.54         0.00         0.00           026         400         400         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1600         49.23         0.04         604.17         1.21         130.15         0.26         39.73         0.08         42.47           20         415.11         0.00         223.33         0.09         8589.90         0.09         11.51         0.00         13.70	A/M47A-4/NCPP-105 (b)	47000	49,23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	1.00
ous: (b)         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           7         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         1600         49.23         0.04         604.17         1.21         130.15         0.10         39.73         0.08         42.47           2         2         415.11         0.00         223.31         0.00         8589.90         0.09         11.51         0.00         13.70	GTC-85 (c)	3500	0,13	0.00	3.88	0.01	14.83	0.03	0.54	00.00	00.0	0.00
7         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           7         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08         42.47           1         1600         49.23         0.04         604.17         0.48         130.15         0.10         39.73         0.03         42.47           2         2         415.11         0.00         223.31         0.00         8589.90         0.09         11.51         0.00         13.70												
7 4000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47 4000 49.23 0.10 604.17 1.21 130.15 0.26 39.73 0.08 42.47 1600 49.23 0.04 604.17 0.48 130.15 0.10 39.73 0.03 42.47 20 415.11 0.00 223.31 0.00 8859.90 0.09 11.51 0.00 13.70	Miscellaneous: (b)											
4000     49.23     0.10     604.17     1.21     130.15     0.26     39.73     0.08     42.47       1600     49.23     6.04.17     0.48     130.15     0.10     39.73     0.03     42.47       20     415.11     0.00     223.31     0.00     8589.90     0.09     11.51     0.00     13.70	A/M32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
1600	A/M27T-5	4000	49.23	183	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
20 415:11 0:00 222331 0:00 8589:90 0:09 11:31 0:00 13:70	A/M42M-2	1600	49,23		604.17	0,48	130.15	0.10	39.73	0.03	42.47	0.03
	HLU-196	20	415.11	00.0	.223.31	000	8589.90	0.09	11.51	0.00	13.70	0.00

			Ξ.	Emissions fron	n Ground S	Table F-20 ARS 3 Is from Ground Support Equipment at NAS Oceana	ipment at N.	AS Oceana					
<u> </u>				200	. ·	NOX	W.	00		202	7	PM-10	10
			Fuel Consumption (gal/yr)	16/1000 gal	Total (TPY)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
<u> </u>	6661	Tow Tractors: (a)										:	
		A/S32A-30A (JP-5)	22400	64.60	0.72	436.67	4.89	268.50	3.01	5.20	90.0	8.27	0.09
		A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
<del></del> .		TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	5.20	0.00	8.27	0.00
		A/S32A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	5.20	90.0	8.27	0.10
		Flight Line Electric Power Units					,						
		NC8A (b)	16000	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
		NC10C (b)	8000	49.23	0.20	604.17	2.42	130.15	0.52	39.73	0.16	42.47	0.17
		**************************************											
		Jet Engine Start Units				*							
		A/M47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	1.00
F-		GTC-85 (c)	3500	0.13	0.00	3.88	10.0	14.83	0.03	0.54	0.00	0.00	0.00
47													
		Miscellaneous: (b)											
		A/M32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
		A/M27T-5	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
		A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
		HLU-196	20	415.11	0.00	223.31	00.0	8589.90	60.0	11.51	00.00	13.70	0.00
			Total		3.69		34.66		17.22	:	1.73		1.92
		ACCORDING TO A SECURIT OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY 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Footnotes:

(a) Emission factors from AP-42 Volume II for gasoline-powered wheeled tractor for TA-75, IG-75, & A/S32A-30 and diesel-powered wheeled tractors for all others.
(b) Emission factors from AP-42 Volume I for Uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301..
(c) Emission factor from USEPA 1992 for aircraft auxilliary power units.

Notes:
(1) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(2) Conversion from Ib/MMBtu assuming heating value for JP-5 of 137,000 Btu/gallon.

	4		a viole	EMISSION RALES FOR SINGLE ENGINE MAINTENANCE RUN-UPS AT NAS OCEANA (IN-FRAME ENGINE TESTING)	(IN-FR	(IN-FRAME ENGINE TESTING)	TESTING)	en regioni	SUCERITA				
(Aircraft)	Setting (1)	Setting (1)	ruel Flow (lb/min)			Emission Factor ([1b /1000 lb fuet]/eng)				(Ib/s	Emission Rates	3 n-up)	
	•	(minutes)		VOC(2)	NOX	00	802	PM10	VOC(2)	NOx	02	802	PM10
(F-14A)	Low Fower	7.00	15.3	6718	133	13 33	9 40	9 05	484	34.0	7.4	100	
	75%	12.00	71.7	1 48	10.74	3.43	0.40	6.70	2007	6.50	2.30	0.04	9,19
•	Total					2	2	00		7.24	2.73	0.34	4.90
1	1								C0**	60.6	0.71	<b>6.0</b>	2.8
	High Power												
<u>!</u>	Idle	10.00	15.3	31.42	3.22	55.51	0.40	968	481	070	8 40	0.06	1 27
	75%	25.00	7.1.7	1.48	10,74	3.43	0.40	5.70	2.65	19.25	6.15	0.72	10 22
	100% (Mil)	10.00	117.5	0,77	19.60	1.38	0.40	2.98	06.0	23.03	1.62	0.47	3.5
i	A/B (Z5)	4.00	7.96.7	0.20	. 4.79	10.77	0.40	00.0	0.64	13.26	34.32	1.27	000
F110-GE-400	I Otal					1			9.00	\$8.04	50.58	2.52	15.0
(F-14B/D)	Idle	5.00	19.5	3.65	2.7	09 91	0 40	17 38	75.0	A 37	571	500	-
:	75%	12.50	133.0	0.26	19.61	92.0	0.40	4.30	0.43	32.60	92	0.07	7.15
	Total						***************************************		0.79	32.87	2.88	0.70	200
													!
	High Power		!										:
· · · ·	Idle	10.00	19.5	3.63	2.77	16.60	0.40	12.38	0.71	0.54	3.24	0.08	2.41
-	75%	20.00	133.0	0.26	19.61	0.76	0.40	4.30	69:0	52.16	2.02	1.06	11.44
•	IKP	15.00	195.3	0.40	28.63	0.84	0.40	2.81	1.17	83.87	2.46	1.17	8.23
-1-	Tatel	4.00	745.0	0.13	77%	23.12	0.40	0.00	0.49	34.85	87.39	1.51	00.0
J-52-P-8B	Low Power								200	4717	95.11	3.83	22.08
(A-6)	Idle	15.00	11.3	48.96	1.79	63.78	0.40	00'0	8 32	030	10 84	0.07	000
	78-82%	10.00	72.0	79'0	10.10	3.00	0.40	00.00	0.48	7.27	2.16	0.29	000
	Total				A. F. Maggarage				8.80	7.58	13.00	0.36	0.00
	Hieh Power									25 CON 25		: :	
	Idle	15.00	П.3	48.96	1.79	63.78	0.40	000	30 ×	υξυ	10 81	70.07	200
•	78-82%	2.00	72.0	0.67	10.10	3.00	0.40	0.00	0.24	3.64	1.08	0.14	0.00
	94-100%	8.00	122.8	0.93	13.05	0.71	0.40	00.00	16.0	12.82	0.70	0.39	00.0
E404-GE-400	Total	:	:						9.45	16,76	12.59	0.60	0.00
(F/A-18)	Idle	6.50	10.4	58.18	1.16	137.34	0.40	12.38	393	0.08	900	0.03	Vă U
	20%	3.50	0.601	0.35	14.80	1.09	0.40	6.10	0.13	5.65	0.42	0.15	2.5
· · · · ·	Total						1.		4.07	5.72	9.70	0.18	3.16
					(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)			!			!		
	High Power	11		11 - 18 - 18 - 18 - 18 - 18 - 18 - 18 -									
	Idle	13.00	10.4	58.18	9] []	137.34	0.40	12.38	7.87	0,16	18.57	0.05	1.67
	/0/e	8.30	109.0	0.35	14.80	1.09	0.40	4.00	0.32	13.71	1.01	0.37	3.71
-	W.B.	2.00	473 3	0.13	933	1.05	0.40	18.7	77.0	18.00	0.75	0.29	2.01
1		·	1										

(1) Power setting and time in power setting for F-14 A, F-14B/D, F/A-18 aircraft, and A-6 provided by AESO and COMNAVAIRLANT.

(2) Aircraft VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(3) Shaded areas indicate organic compounds

(3) Shaded areas indicate organic compounds

(4) B = afterburner operating

(6) = carbon monoxide

(75% = 75% throttle setting

(8) = carbon monoxide

(8) = sulfur dioxide

(8) = sulfur dioxide

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Number of   Number of   Number of   Number of   Number of   Single Engine   Lib per Single   Run-ups/yr Engine Run-up   9,617   4,65   11,180   4,65   11,180   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,420   4,65   11,42
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

						Table F-22							
			EMISSI	EMISSIONS FROM SIN	GLE ENGINE FC	ARS 3 M SINGLE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	VINTENANCE 96-1999	RUN-UPS AT N	IAS OCEANA				
	Type of	Run-up mode	Number of	e voce	6	ĬŎN.	×	0	63	208	71	E.	PMIO
	Aircraft (Engine) and		Single Engine	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	
The second second second			Transport			dn-may amilying	(4.44)		(11 X)	Engine run-up	(111)	Engine Kun-up	(111)
8661	F-14A (TF30-P-412A)	Low Power	6,012	.4.65	13.96	626	28.82	16.8	26.78	0.39	0.00	5.87	17.63
	20	High Power	171	00.6	0.77	58.04	4.96	50.58	4.32	2.52	00.00	15.09	1.29
	F-14B/D (F110-GE-400)	Low Power	5,936	62.0	2,34	32.87	97.36	2.88	8.55	0.70	2.09	8.36	24.80
	26	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09.0	22.08	3.44
	F/A-18 (F404-GE-400)	Low Power	7,632	4.07	15.52	5.72	21.85	9.70	37.02	0.18	69.0	3.16	12.07
	132	High Power	461	8.54	161	40.60	9.36	42.21	9.73	1.09	0.25	7.39	1.70
				Total	35.04		189.24		101.21		3.63	:	60.94
1999	F-14A (TF30-P-412A)	Low Power	6,012	4.65	13.96	65'6	28.82	16.8	26.78	0.39	1.16	5.87	17.63
	20	High Power	171	00.6	0.77	58.04	4.96	50.58	4.32	2.52	0.22	15.09	1.29
	F-14B/D (F110-GE-400)	Low Power	5,936	0.79	2.34	32.87	97.56	2.88	8.55	0.70	2.09	8.36	24.80
	26	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09.0	22.08	3.44
								-					
	F/A-18 (F404-GE-400)	Low Power	9,020	4.07	18.34	5.72	25.82	9.70	43.75	0.18	0.81	3.16	14.27
	156	High Power	545	8.54	2.33	40.60	90.11	42.21	11.50	1.09	0.30	7.39	2.01
				Total	38.22	がは、「別館をして利用」	16.491		109.71		<17	-	63.44

Key:

(1) Number of maintenance run-ups for F-14A, F-14B/D, and F/A-18 aircraft in 1997 and 1999 are from Wyle (1997). 1993, 1996, and 1998 maintenance run-ups were scaled from 1997 based on number of aircraft stationed at NAS Oceana. (2) Maintenance run-ups for A-6 based on actual 1993 data. 1996 data scaled using 1993 data. (3) Aircraft VOC reported as HC in the form CHy/x (3) Aircraft VOC reported as HC in the form CHy/x (4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Source Type Type Stationary Sources: Boilers Generators Generators Fugine Testing Fuel Handling Service Station Painting	1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993   1993	1993 CO 1.87 26.03 0.00 0.00	50.00 0.00 0.00 0.00	3.84 0.61 0.00 0.00 0.00	STATIONARY SOUIRCE EMISSIONS AT NAS OCEANA - ARS 3           FOR 1935         TOME         TOME         FORT           VOC         NOX         CO         SOZ         FMIT           0.78         29.13         7.52         23.76         3.63           0.71         8.67         1.87         0.57         0.61           2.95         22.13         30.07         1.01         2.78           2.95         22.13         30.07         1.01         2.78           4.46         0.00         0.00         0.00         0.00         0.00           13.29         0.00         0.00         0.00         0.00         0.00         0.00	FOR 1933 AND 1996-1999 1996 1996 7.52 2 3.0.07 0.00 0.00	SO2 SO2 23.76 0.37 0.00	A - ARS 3  PMIO  0.61  2.78  0.00  0.00  0.00	0.78 29.13 0.78 29.13 2.11 27.87 3.75 29.99 0.34 0.00 14.00 0.00	1997 CO 7.27 39.88 0.00 0.00	\$02 23.76 3.77 1.23 0.00 0.00	3.63 2.21 3.71 3.71 6.00 0.00
Construction:		0.00	00:00	0.00	00:00	00.00	00:00	00.00	0.00	00.00	00.00	0.00
1	XX XX	35.31	73.60	673	77.64 50.03	10 46	25 34	7.07	25.85	24 67	78 78	9 53

			S	FATIONARY S	OURCE EMIS FOR 1993 A	RCE EMISSIONS AT NAS FOR 1993 AND 1996-1999	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 3 FOR 1993 AND 1996-1999			
Source			8661	or manufacture of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of				6661		
Type	YOC	NOX	00	202	PMI0	AOC	NOX	00	802	PM10
Stationary Sources:									The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	
Boilers	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
										-
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
			*******							
Engine Testing	9.70	54.02	67.01	1.81	9.72	10.59	56.65	70.04	1.88	10.63
JP-5 Fuel Handling	0.81	0.00	0.00	0.00	00:00	06'0	000	0.00	0.00	0.00
										-
Service Station	6.40	0.00	0.00	0.00	00.0	6.72	00.0	0.00	0.00	00.0
Painting	34.12	00'0	0.00	000	00.0	41.00	00:0	0.00	0.00	00.0
									:	:
Construction:	000	0.00	0.00	0.00	00.00	2.42	24.74	7.75	2.28	3.65
Total	53.76	109.02	80.96	28.40	15 31	72 17	136 30	01.74	75.05	ic

VOC = volatile organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
SO2 = sulfur dioxide
PM10 = particulate matter Key:

				EMISS	EMISSION RATES FOR A	Tabi IRCRAFT EN	Table F-24 OR AIRCRAFT ENGINE TESTS AT	Table F-24 ES FOR AIRCRAFT ENGINE TESTS AT NAS OCEANA - ARS 3 (SING! R ENGINE IN TEST CELLS)	ANA - ARS 3					
Engine	Power	Time in Power	Fuel Flow	Calculated Fuel		Emis	Emission Factor (3)	)			Single	Single Engine Test Emissions	issions	
(Aircraft)	Setting	Setting (1)	(Ib/min)	Usage (2)		(llb /1	[]b /1000 lb fuel/eng					(spunod)		
	<b>.</b>	(minutes)		(gallons/test)	VOC (4)		8	ı	PM10	VOC (4)	NOx	9	202	PM10
F30-P-412A	Idle	28.00	15.33	63.12	31.42	3.22	55.51	0.54	8.96	13.49	1.38	23.83	0.23	3.85
(F-14A)	75%	5.00	71.67	52.70	1.48	10.74	3.43	0.54	7.98	0.53	3.85	1.23	0.19	2.86
 `` '	81%	23.00	77.40	261.79	1.20	16,02	1.62	0.54	7.98	2.14	28.52	2.88	96.0	14.21
1	A/B	22.00	796.67	2577.46	0.20	4.79	10.77	0.54	0.00	3.51	83.95	188.76	9.46	0.00
!	Total	78.00		2955.08					Per Test	19.66	117.70	216.70	10.85	20.91
F110-GF-400	Idle	54.00	19.50	154.85	3.97	2.74	15.75	0.54	12.38	4.18	2.89.	16.58	. 0.57	13.04
(F-14R/D)	81%	44.00	143.70	929,82	0.26	19.61	0.76	0.54	2.81	191	123.99	4.81	3.41	17.71
- (Size : )	43%	25.00	198.22	728.75	0.31	28.53	1.08	0.54	2.81	1.54	141.38	5.35	2.68	13.92
1	A/B	11.00	945.05	1528.76	3.75	12,64	44.21	0.54	0.00	38.98	131.40	459.59	5.61	0.00
<del>-i</del>	Total	134.00		3342.18					Per Test	46.34	399.66	486.33	12.27	44.73
	-													
L.52.P.8R	Ground Idle	32.00	11.33	53.32	48.96	1.78	63.78	0.54	000	17.75	0.65	23.12	0.20	0.00
⊥ ( <b>4-6</b> )	IRP	18.00	122.83	325.14	1.08	13.05	0.71	0.54	00'0	2.39	28.85	1.57	1.19	0.00
<u>.</u>	75% Thrust	-	72.00	254.12	0.87	10.10	3.00	0.54	0.00	1.50	17.45	5.18	0.93	0.00
1	3k I bs Thrust	_	38,33	140.92	1.99	6.34	10.54	0.54	00:00	1.91	6.08	10.10	0.52	0.00
	Total	99.00		773.49					Per Test	13.55	53.03	39.98	2.84	0.00
-														
404-GE-400	Idle	52.00	10.40	79.53		1.16	137.34	0.40	12.38	31.46	0.63	74.27	0.22	6.70
(F/A-18)	%08	34.00	131.60	658.00		18.71	1.17	0.40	6.10	1.48	83.72	5.24	1.79	27.29
()	A/B	3.00	473.28	208.80	0.13	9.22	23.12	0.40	0.00	0.18	13.09	32.83	0.57	0.00
	17-1	50.00		22 770					Por Tout	4111	07.43	112 34	757	33.99

Notes:

(1) Power setting and time in power setting provided by COMNAVAIRLANT.

(2) Assumes a product density of 6.8 lb/gallon for JP-5.

(3) Data for calculating modal emission rates provided by the Navy Aircraft Environmental Support Office.

(4) Aircraft VOC reported as HC in the form CHy/x

(5) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

A/B Max. = maximum afterburner IRP = intermediate rated power (same as military) 75% = 75% throttle setting

EMISSIONS FROM AIRCRAFT ENGINE TESTING AT NAS OCEANA - ARS 3 FOR 1993 AND 1996-1999

					(SING)	ωį	ENGINE IN TEST CELLS)						
Year	Engine	Number of	Number of	20A	3)	Jan. 1	NOX	0	00	SC	S02	PM10	10
	Model	Aircraft	Tests/Year	per test	Total	per test	Total	per test	Total	per test	Total	per test	Total
			(1)	(II)	Crry	( <b>40</b> )	(TEN)	(lb)	(TPY)	(lb)	(TPY)	( <b>B</b> )	(TPY)
1993	TF30-P-412A	80	77	19.66	0.76	117.70	4.56	216.70	8.39	10.85	0.42	20.91	0.81
	F110-GE-400	55	99	46.34	1.52	399.66	13.12	486.33	15.97	12.27	0.40	44.73	1.47
	J-52-P-8B	986	83	23.55	0.98	53.03	2.21	39.98	1.66	2.84	0.12	0.00	00'0
				Total	3.26		19.89		26.03		0.94		2.28
												+	
9661	TF30-P-412A	93	06	19.66	680	117.70	5.30	216.70	9.76	10.85	0.49	20.91	0.94
	F110-GE-400	69	82	46.34	161	399.66	16.47	486.33	20.04	12.27	0.51	44.73	1.84
	F404-GE-400 (4)	12	0	33.12	0.00	97.43	0.00	112.34	00.00	2.57	00.0	33.99	00.0
	J-52-P-8B	4	14	23.55	0.16	53.03	0.36	39.98	0.27	2.84	0.02	0.00	00:0
				Total	2.95		22.13		30.07		1.01		2.78
												:	
1997	TF30-P-412A	95	92	19.66	06:0	117.70	5.41	216.70	9.97	10.85	0.50	20.91	0.96
	F110-GE-400	103	123	46.34	2.85	399.66	24.58	486.33	29.91	12.27	0.75	44.73	2.75
	F404-GE-400 (4)	12	0	33.12	0.00	97.43	000	112.34	00.00	2.57	0.00	00.0	00.0
				Total	3.75		29.99		39.88		1.25		3.71
:	:												
1998	TF30-P-412A	20	09	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (S)	132	298	33,12	4.94	97.43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
	i		!	Total	9.70		54.02		67.01		1.81		9.72
:	:												
6661	TF30-P-412A	20	09	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	67	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	156	352	33.12	5.83	97.43	17.15	112.34	19.77	2.57	0.45	33.99	5.98
			1	Total	10.59		\$6.65		70.04	:	1.88		10.63

Number of engine tests per F-14A, F-14B/D, and F/A-18 aircraft from U.S. Navy (1997) and Wyle (1997). Number of A-6 engine tests per aircraft assumed to be the same as F-14A engine tests per aircraft.
 Aircraft engine emissions of VOC reported as HC in the form CHy/x.
 Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
 Adversary squadron engine tests not conducted at Oceana due to lack of F404 test equipment at NAS Oceana.
 Includes adversary squadron test cell events due to installation of F404 test equipment at NAS Oceana.

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

02/18/98 08

Table F-26	PARKING LOT CONSTRUCTION (4 LOTS) AND AIRCRAFT APRON - ARS 3	Equipment Exhaust Emissions
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		Equipment	Days		Emission F	Emission Factors (Ib/1000 gal)	) gal)			EMIS	EMISSIONS (lbs)		
1	Equipment List	quantity	Osed	NOX	V0C	93	802	PM10	XON	VOC	တ	S02	PM10
State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   State   Stat	Crane	0	0	403	35.0	82.0	31.2	27	0.0	0.0	0.0	0.0	0.0
Part	Backhoe Loader	2	50	395	39.0	133.0	31.2	27	1975.0	195.0	665.0	156.0	135.0
Coment mixer, incl(gm/hr   50   60   60   60   60   60   60   60	Pan Scraper	1	16	340	9.61	7.76	31.2	27	272.0	. 15.7	78.2	25.0	21.6
id Loader, wheels         1         50         403         23.5         94.0         31.2         29         1007.5         58.8         235.0         78.0           ver         0         0         403         35.0         82.0         31.2         24         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Hi-Lift	0	0	364	31.0	121.0	31.2	25	0.0	0.0	0.0	0.0	0.0
ver         0         0         403         55.0         82.0         31.2         24         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Front-end Loader, wheels	-	50	403	23.5	94.0	31.2	29	1007.5	58.8	235.0	78.0	72.5
ader         1         0         391         23.5         94.0         31.2         24         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	0.0
er         2         50         375         43.0         74.3         31.2         22         1875.0         215.0         371.5         156.0           er         2         50         375         43.0         74.3         31.2         25         1875.0         215.0         371.5         156.0           tor         3         50         364         31.0         121.0         31.2         24         2730.0         232.5         907.5         234.0           tor         3         50         403         23.5         121.0         31.2         24         2730.0         232.5         907.5         234.0           cement mixer, mob(gm/ cement mixer, idl(gm/nr 4         4         50         8.0         2.1         9.93         2.8         2.15         35.4         92.5         437.4         123.3           cement mixer, idl(gm/nr cement mixer, idl(gm/nr 4         4         50         40.2         0         0         11.5         92.5         437.4         123.3           cement mixer, idl(gm/nr a         4         50         40.2         0         0         11.5         432.5         437.4         1240.3           Total 1, 10/4	Track loader	-	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
er         2         50         375         43.0         74.3         31.2         24         213.0         215.0         215.0         215.0         210.0         31.2         24         2730.0         232.5         907.5         234.0           tor         3         50         364         31.0         121.0         31.2         24         2730.0         232.5         907.5         234.0           cement mixer, mob(gm/ cement mixer, idl(gm/mr 4         4         50         8.0         21         9.93         2.8         2.15         352.4         92.3         437.4         123.3           cement mixer, idl(gm/mr cement mixer, idl(gm/mr 4         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           cement mixer, idl(gm/mr         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           cement mixer, idl(gm/mr         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           Total University idl(gm/mr         4         50         13.2         40.2         0 </th <th>Grader</th> <th>2</th> <th>50</th> <th>37.5</th> <th></th> <th>74.3</th> <th>31.2</th> <th>22</th> <th>1875.0</th> <th>215.0</th> <th>371.5</th> <th>156.0</th> <th>110.0</th>	Grader	2	50	37.5		74.3	31.2	22	1875.0	215.0	371.5	156.0	110.0
actor         3         50         364         31.0         121.0         31.2         24         2730.0         222.5         907.5         234.0           3         50         364         31.0         121.0         31.2         24         2730.0         222.5         907.5         234.0           K/cement mixer, mob/gm/ k/cement mixer, idl(gm/hr 4         4         50         8.0         2.1         59         2.15         58.8         312.5         78.0           K/cement mixer, idl(gm/hr         4         50         8.0         2.1         993         2.8         2.15         357.4         92.5         437.4         123.3           K/cement mixer, idl(gm/hr         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           K/cement mixer, idl(gm/hr         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           K/cement mixer, idl(gm/hr         4         50         13.2         40.2         0         0         11.6         14.3         35.4         0.0           Annual Mixer         5         13.2         40.2	Bulldozer	2	50	375	43.0	74.3	31.2	25	1875.0	215.0	371.5	156.0	125.0
3   50   364   310   121.0   31.2   24   2730.0   232.5   907.5   234.0     1   50   403   23.5   125.0   31.2   29   1007.5   58.8   312.5   78.0     K/cement mixer, mob/gm/	Compactor	3	50	364	31.0	121.0	31.2	24	2730.0	232.5	907.5	234.0	180.0
K/cement mixer, mob/gm/         4         50         403         23.5         125.0         31.2         29.3         2.15         352.4         92.5         437.4         123.3           K/cement mixer, mob/gm/         4         50         8.0         2.1         9.93         2.8         2.15         352.4         92.5         437.4         123.3           K/cement mixer, idl/gm/hr         4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           K/cement mixer, idl/gm/hr         4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           Total TPY         13836.1         1330.0         2.16         0.66         2.16         0.65	Roller	3	20	364	31.0	121.0	31.2	24	2730.0	232.5	907.5	234.0	180.0
rk/cement mixer, mob/gm/         4         50         8.0         2.1         9.93         2.8         2.15         352.4         92.5         437.4         123.3           rk/cement mixer, idl/gm/hr         4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           rk/cement mixer, idl/gm/hr         4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           Total, lb/r         13836;1         13836;1         1330.0         4321.5         1240.3           Total TPY         6.92         0.66         2.16         0.62	Paver	1	50	403	23.5	125.0	31.2	29	1007.5	58.8	312.5	78.0	72.5
4         50         8.0         2.1         9.93         2.8         2.15         95.3         437.4         123.3           4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           Total, lb/r         13836.1         1330.0         4321.5         1240.3           Total TPY         6.92         0.66         2.16         0.62													
4         50         13.2         16.2         40.2         0         0         11.6         14.3         35.4         0.0           Total, Ib/yr         13836.1         1336.0         4321.5         1240.3           Total TPY         6.92         0.66         2.16         0.62	haul trk/cement mixer. mob(gm/	4	50	8.0	2.1	9.93	2.8	2.15	352.4	92.5	437.4	123.3	94.7
Total, lb/yr 13836.1 1330.0 4321.5 1240.3  Total TPY 6.92 0.66 2.16 0.62	haul trk/cement mixer. idl/gm/hr	4	50	13.2	16.2	40.2	0	0	11.6	14.3	35.4	0.0	0.0
6.92 0.66 2.16 0.62		,	-	I bejensjonen				Total, lb/yr	13836.1	1330.0	4321.5	1240.3	991.3
								Total TPY	6.92	0.66	2.16	0.62	0.50

VOC = volatile organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
SO2 = sulfur dioxide
PM10 = particulate matter

### NEW BUILDING/ADDITION CONSTRUCTION - ARS 3 Equipment Exhaust Emissions

	Equipment	Days		Emission Fa	Emission Factors (1b/1000 gal)	gal)			EMIS	EMISSIONS (lbs)		
EQUIPMENT LIST	quantity	Used	NOX	VOC.	00	802	PM10	NOX	VOC	00	802	PM10
Crane	3	120	403	35.0	82.0	31.2	27	7254.0	630.0	1476.0	561.6	486.0
Backhoe Loader	2	120	395	39.0	133.0	31.2	27	4740.0	468.0	1596.0	374.4	324.0
Pan Scraper	-	120	340	9.61	7.76	31.2	27	2040.0	117.6	586.2	187.2	162.0
Hi-Liñ	4	120	364	31.0	121.0	31.2	25	8736.0	744.0	2904.0	748.8	0009
Front-end Loader, wheels	-	120	403	23.5	94.0	31.2	. 29	2418.0	141.0	564.0	187.2	174.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	0
Track loader	0	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	00
Grader	-	120	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	132.0
Bulldozer	2	120	375	43.0	74.3	31.2	25	4500.0	516.0	8916	374.4	300.0
Compactor	_	120	364	31.0	121.0	31.2	24	2184.0	186.0	726.0	187.2	144.0
Roller	0	0	364	31.0	121.0	31.2	24	0.0	0.0	0.0	0.0	00
Paver	0	0	403	23.5	125.0	31.2	29	0.0	0.0	0.0	0.0	0.0
												}
haul trk, mob(gm/mi)	7	120	8.0	2.1	9.93	2.8	2.15	1480.2	388.5	1837.3	518.1	397.8
haul trk, idl(gm/hr)	7	120	13.2	16.2	40.2	0	0	48.8	59.9	148.8	0.0	0.0
							Total Lb/yr	35651.0	3509.1	11175.6	3326.1	2719.8
							Total TPY	17.83	1.75	5.59	1.66	1.36

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

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# Table F-27 ANNUAL DEMOLITION PARTICULATE EMISSIONS - ARS 3

Floor Space	STRUCTURE	DEBRIS	VEHICLE	EMISSIONS SUM	EMISSIONS SUM
(SQ FT)	REMOVAL (LBS)	REMOVAL (LBS)	REMOVAL (LBS) REMOVAL (LBS) ACTIVITY (LBS)	LBS/YR	
169,025	8.6	158.9	1799.3	1966.8	0.98

Notes:

Demolition square ft assumed = 10 % of new construction sq ft

PM emission from structure takedown based on sq ft \*EF

PM emission from debris removal based on sq ft \*EF PM emission from on-site vehicle activity based on sq ft \*EF

Pushing (bulldozing) PM emission put under site prep spreadsheet Reference EPA-450/2-92-004 (Fugitive Dust document)

(all EF's in EPA document converted to english units)

	=	ANNUAL SITE PREPARATION PARTICULATE EMISSIONS FOR CONSTRUCTION AT NAS OCEANA - ARS 3
'ΑΤΙ		
PA	BULLDOZIN PAI	~
OIL	(LBS) SOIL REMOV(LBS) THMOVING (LBS LBS/YR	DAYS (LBS) SOIL F
	009	100 600

Notes:

Acreage estimate based on building sq ft\*2

Estimate activity days for preferred, develop ratio days:acres

Apply ratio to ARS acreages to get activity days

Bulldozing pm emissions based on 8hr/activity day \* EF (EPA 1992)

Soil removal emiss based on VMT/acre \*acres\*EF (EPA 1992)

Earthmoving emiss based on soil removal miles \*3 (BEE)\*EF

EPA 1992 is Fugitive Dust BG document (EPA-450/2-92-004)

	Table F-28			
Total Co	Total Construction Emissions (Exhaust and Dust) - ARS 3	Just) - ARS 3		
Project/Source	Emis	Emissions (tons/yr)	r)	
Engine Exhaust Emissions	Voc	00	SOx	PM10
Parking Lot Construction	0.66	2.16	0.62	0.50
Building/Addition Const. (total)	1.75 1.7,83	5.59	1.66	1.36
Demolition/Construction Activity				
Mechanical dust Generation	0:00	0.00	00.0	1.79
Total	2,42	7.75	2.28	3.65

VOC = volatile organic compounds

NOx = oxides of nitrogen

CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

Source Type	Vocs	XON	1993 CO	EN SO2	EMISSIONS	SUMMA	RY - NAS FOR 19 (to	7 - NAS OCEANA AND NA FOR 1993 AND 1996-1999 (tons per year) 1996	996-1999 ar)	LF FENT	IONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 3  FOR 1993 AND 1996-1999  (tons per year)  1996	RS 3	1997		-
NAS Oceana:				700	OTIVIT	5 2	XON I	3	202	Z Z	XOCs	NOX	8	<b>S</b> 02	
Mobile Sources:															
Aircraft Operations	500.57	353.51	1,018.55	23.55	223.43	264.78	244.52	573.22	14.59	180.11	244.92	299 54	566 93	16.67	
Total Aircraft	500.57	353.51	353.51 1,018.55	23.55	223.43	264.78	244.52	573.22	14.59	180.11	244.92	299.54	566.93	16.62	
Other Mobile Sources:	,														
COE	5.13	26.43	72.65	1.71	2.00	3.09	27.35	17.03	1.84	2.24	4.57	34.01	18.73	2.20	. •
Maintenance Kun-ups	71.97	165.99	131.90	5.65	46.27	30.13	131.19	65.36	3.91	48.77	31.59	197.60	85.86	5.51	
Generators	0.56	6.89	1.48	0.45	0.48	0.56	6.89	1.48	0.45	0.48	0.56	68.9	1.48	0.45	<del></del>
Total Other Mobile	77.65	199.30	206.03	7.81	48.75	33.78	165.43	83.87	6.20	51.50	36.72	238.49	106.07	8.17	-
Stationary Sources:														;; ;; 	
Boilers:	1.13	32.32	8.31	22.09	3.84	0.78	29,13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	
·6															
Generators	0.71	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3 77	
													j.	) : : :	
Engine Test Cells	3.26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	
										1					-
JP-5 Fuel Handling	99.0	0,00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	
			1												
Service Station	19.35	0.00	0.00	0.00	0.00	4.46	0.00	0.00	0.00	00.0	4.67	0.00	0.00	0.00	
								1							
Painting	19.30	0.00	0.00	0.00	0.00	13,29	0.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00	
		200						:	:	:					
Construction:	00.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total Stationary	17.77	00 VZ	36.31	22.60	-									1	
Total Stational y	1.1	00.00	70.71	73.00	0.73	72.05	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	
Total NASO	622.64	613.70 1,260.78	1,260.78	54.97	278.91	321.21	469.88	696.54	46.13	238.64	307.50	625.03	727.67	53.57	303.60
NALF Fentress:															نانـ
Aircraft	13.48	146.63	37.00	6.81	30.87	7.20	145.45	19.20	6.03	39.01	7.73	175.88	19.05	88 9	47.82
Total Annual.	27 393	140	つ 100 ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・	4 1 1		2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	J. C. L. Charles	1				The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	22.5	200	j



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		<b>EMISS</b>	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 3	MARY -	NAS OCE	ANA AND	NALF FE	NTRESS -	ARS 3	
				FO.	FOR 1993 AND 1996-1999 (tons per vear)	VD 1996-19 er vear)	66			
			1998					1999		
Source Type	VOCs	NOX	00	S02	PM10	VOCs	NOx	00	802	PM10
NAS Oceana:										
Mobile Sources:										
Aircraft Operations	445.76	445.46 1,143.65	1,143.65	22.06	314.51	495.68	476.73	1,277.25	23.42	334.94
Fotal Aircraft	445.76	445.46	445.46 1,143.65	22.06	314.51	495.68	476.73	1,277.25	23.42	334.94
Other Mobile Sources:										
GSE	3.67	34.57	17.17	2.32	2.79	3.69	34.66	17.22	1.73	1.92
Maintenance Run-ups	35.04	189.24	101.21	3.63	60.94	38.22	194.91	109.71	5.17	63.44
Generators	0.56	68'9	1.48	0.45	0.48	0.56	68'9	1.48	0.45	0.48
Total Other Mobile	39.27	230.70	119.86	6.40	64.21	42.46	236.46	128.41	7.35	65.84
Stationary Sources:										
Boilers:	0.62	£1 <i>''L</i> Z	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	727	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	9.70	54.02	67.01	1.81	9.72	10.59	56.65	70.04	1.88	10.63
JP-5 Fuel Handling	0.81	00'0	0.00	0.00	0.00	0.90	00.0	0.00	0.00	0.00
0										
Service Station	6.40	0.00	00.00	0.00	0.00	6.72	00.00	0.00	0.00	0.00
Dointing	c) Pe	Ju u	00 0	000	000	00 Ly	υυ ü	00 0	000	0.00
ramming	91:10	3	8	2000	8.	2011	8	2		3
Construction:	0.00	0.00	0.00	0.00	0.00	2.42	24.74	7.75	2.28	3.65
		Cause 1	,							. 6
Total Stationary	53.76		80.96	28.40	15.31	64.36	136.39	91.74	30.76	19.87
Total NASO	538,78	785.18	1,344.47	56.86	394.02	602.50	849.58	1,497.40	61.53	420.65
NALF Fentress:	× ×	227.12	24.05	8.41	67.73	8 92	237.23	25.38	8.74	72.12
· · · · · · ·	25 47.4	E47-32 1 017-30 1 369 63	1 369 63	76 37	161 76	K111.45	K11 45 1 106K 91		70.07	40.71

SO2 = sulfur dioxide. Key: VOC = volatile organic compounds. NOx = oxides of nitrogen. CO = carbon monoxide.

JP-5 = jet fuel. PM10 = particulate matter. JP-5 GSE = Ground Support Equipment

NET EMISSIO	1 able F-50 NET EMISSIONS CHANGE - NAS OCEANA AND NALF FENTRESS - ARS 3	1 able F-30 VAS OCEANA A	ND NALF FE	NTRESS - AR	<b>6</b> 0
		(tons per year)			
Year	VOCS	NOx	00	S02	PM10
NAS Oceana:					
1993	622.64	613.70	1260.78	54.97	278.91
9661	321.21	469.88	696.54	46.13	238.64
1661	307.50	625.03	727.67	53.57	303.60
1998	538.78	785.18	1344.47	56.86	394.02
1999	602.50	849.58	1497.40	61.53	420.65
Net Change:					
1993 to 1999	-20.14	235.88	236.62	6.56	141.74
NALF Fentress:					
1993	13.48	146.63	37.00	6.81	30.87
1996	7.20	145.45	19.20	6.03	39.01
1661	7.73	1.75.88	19.05	6.88	47.82
1998	8.58	227.12	24.05	8.41	67.73
1999	8.92	237.23	25.38	8.74	72.12
Net Change:					
1993 to 1999	-4.57	09.06	-11.62	1.94	41.26
Net Change NAS Oceana and NALF Fentress:	pu				
1993 to 1999	-24.71	326.48	225.00	8.49	187 00

Key:

VOC = volatile organic compounds NOx = oxides of nitrogen

CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

Table F-31

ARS 4

TOTAL AIRCRAFT OPERATIONS AT NAS OCEANA AND NALF FENTRESS

FOR 1993 AND 1996-1999

ircraft Type	Operation type	1993	1996	1997	1998	1999
F-14A	Full LTO	12,465	9,621	9,828	6,885	6,885
	Touch&Go NASO	15,236	12,331	12.596	10.150	10,150
	GCA Box	2,178	1,048	1,071	1,024	1,024
	Interfacility	2,164	1,768	1,806	1,260	1,260
	Touch&Go NALF	10,511	13,124	13,406	9,568	9,568
F-14B/D	Full LTO	8,551	6,913	10,319		11,024
	Touch&Go NASO	10,452	7,979	11,910	12,684	12,684
	GCA Box	1,494	586	875	906	906
	Interfacility	1,485	1,269	1,894	2,000	2,000
	Touch&Go NALF	7,226	9,281	13,854	14,616	14,616
A-6	Full LTO	13,401	2,182	0	0	0
	Touch&Go NASO	16,380	2,666	0	0	0
	GCA Box	2,341	381	0	0	0
	Interfacility	2,326	379	0	0	0
	Touch&Go NALF	11,086	1,805	0	0	0
F/A-18	Full LTO	0	1,763	1,763	12,338	19,388
	Touch&Go NASO	0	2,904	2,904	20,327	31,942
	GCA Box	0	0	0	617	970
	Interfacility	0	0	0		2,794
	Touch&Go NALF	0	0	0	13,221	20,776
A-4	Full LTO	4,169	0	0	0	0
	Touch&Go	5,096	0	0	0	0
F-16	Full LTO	936	0	0	0	0
	Touch&Go	1,144	0	0	0	0
F-5	Full LTO	808	0	0	0	0
	Touch&Go	988	0	0	0	0
TC-4C	Full LTO	638	0	0	0	0
	Touch&Go	780	0	0	0	0
UH-3H	Full LTO	662	0	0	0	0
C-12	Full LTO	261	1,677	1,677	1,677	1,677
	Touch&Go	445	2,759	2,759	2,759	2,759
	GCA Box	0	1,103	1,103	1,103	1,103
S-3	Full LTO	1,741	967	967	967	967
	Touch&Go	1,295	941	941	941	941
	GCA Box	1,323	371	371	371	371
T-2C	Full LTO	1,418	0	0	0	0
T-34	Full LTO	1,040	1,040	1,040	1,040	1,040
E-2/C-2	Full LTO NALF	1,074	0	0	0	0
	Touch&Go NALF	25,058	21,374	21,374	21,374	21,374
Total		166,172	106,230	112,457	148,630	176,219

### Notes:

- (1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual F-14 aircraft population mix at Oceana.
- (2) 1993 Full LTO and Touch and Go NASO operations proportioned from NAS Oceana operations data.
- (3) GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at NAS Oceana. 1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.
- (4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
- (5) A-6 aircraft assumed decommissioned by 1997.
- (6) 1999 and Transient aircraft operations derived from NASMOD analysis (ATAC 1997).
- (7) GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

Key:

LTO = Landing and takeoff cycle

GCA = Ground Control Approach

NASO = Naval Air Station Oceana

NALF = Naval Auxiliary Landing Field

				MODAL	EMISSION	Table F-15 ARS 4 MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	-32 4 AIRCRAFT	LT NAS OC	EANA					
Aircraft (Engine Model)	Mode	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines		9	Emission Factor ([1b /1000 1b fuel]/eng)	ictor el]/eng)			Modal	Modal Emission Rates (1b/mode)	ates	
					VOC(I)	NOX	00	202	PM10 (2)	(I) 20A	XON	00	<b>80</b> 2	PM10 (2)
F-14A	-		15.33	2	31.42	3.22	55.51	0.54	96.8	6.74	69'0	16:11	0.12	1.92
(TF30-P-412A)	Hot		15.33	2	31.42	3.22	55.51	0.54	8.96	15.41	1.58	27.23	0.26	4.40
	Take Off	0.4	196.67	2	0.20	4.79	10.77	0.54	0.00	0.13	3.05	98.9	0.34	00.00
	Climbout	0.4	117.50	2	0,77	19.60	1.38	0.54	2.98	0.07	1.84	0.13	0.05	0.28
	Approach	1.3	71.67	2	1.48	10.74	3.43	0.54	7.98	0.28	2.00	0.64	0.10	1.49
	Taxi In/Idle	5.3	15.33	2	31.42	3.22	55.51	0.54	8.96	5.11	0.52	9.02	60.0	1.46
	T&G Level	1.4	71.67	2	1.48	10.74	3.43	0.54	7.98	0.30	2.16	69.0	0.11	09.1
	GCA Box	9.7	71.67	2	1.48	10.74	3.43	0.54	7.98	2.06	14.93	4.77	0.75	0 II
	Interfacility	9.1	71.67	2	1.48	10.74	3.43	0.54	7.98	0.34	2.46	0.79	0.12	1.83
	Check Idle	25.0	15.33	2	31.42	3.22	55.51	0.54	8.96	24.08	2.47	42.55	0.41	6.87
									Touch and Go	34	90.9	1.46	0.26	3.37
						1.00 E. S. S. S. S. S. S. S. S. S. S. S. S. S.			Full LTO w/hot ref.	22	69'6	55.80	96.0	9.54
									Full LTO w/o hot ref.	X	10.58	71.12	Ξ	12.01
									Interfacility	<b>0.34</b>	2.46	0.79	0.12	8:
		***************************************							GCA Box	2.06	14.93	4.77	0.75	11.10
		There is a second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the secon	A branch a commanda o ser es escretarios desdes										•	
F-14B/D			19.52	2_	3.65	2.77	16.60	0.54	12.38	1.00	0.76	4.54	0.15	3.38
(F110-GE-400)	Hot		19.52	2	3.65	2.77	16.60	0.54	12.38	2.28	1.73	10.37	0.34	7.73
•	Take Off	9.4	195.32	2	040	28.63	0.84	0.54	2.81	90.0	4:47	0.13	0.08	0.44
	Climbout	0.4	195.32	2	0.40	28.63	0.84	0.54	2.81	90.0	4.47	0.13	0.08	0.44
	Approach	1.3	133.03	2	0.26	19.61	92'0	0.54	6.10	0.09	6.78	0.26	0.19	2.11
	Taxi In/Idle	5.3	19.52	2	3.65	11.7	16.60	0.54	12.38	0.76	0.37	3.43	0.11	2.56
	T&G Level	1.4	64.10	2	0.95	8.75	1.64	0.54	6.10	0.17	1.57	0.29	0.10	60'1
	GCA Box	9.7	64.10	2	0.95	8.75	49.	0.54	6.10	81-1	10.88	2.04	0.67	7.59
	Interfacility	9'1	64.10	2	0.95	8.75	29.	0.54	6.10	0.19	6.1	0.34	- 0	1.25
	Check Idle	25.0	19.52	2	3.65	2.77	16.60	0.54	12.38	3.56	2.70	16.20	0.53	12.08
		:							Touch and Go		12.83	0.69	0.37	3.64
				1			:		Full LTO w/ hot ref.		18.79	18.87	0.95	16.67
		:	:						Full LTO W/o hot ret.	, 0, 00 0, 00	19.70 0.71	0.47	4:10	70.17
		:	-					-	CCA Box	2.5	10.68	100	79.0	03.1
									<b>TOO</b>			1	}	<u>}</u>
A-6	Taxi Out/Idle	7.0	11.33	2	42.20	1.79	63.78	0.54	00.0	699	0.28	10.12	0.09	000
(J-52-P-8B)	Hot Refueling Idle	1	11.33		42.20	1.79	63.78	0.54	00.00	19.13	0.81	28.91	0.24	00.0
	Take Off		122.83	2	0.93	13.05	0.71	0.54	00.0	0.09	1.28	0.07	0.05	00.00
	Climbout	0.4	72.00	2	0.58	01 01	3.00	0.54	00.00	0.03	0.58	0.17	0.03	0.00
	Approach	1.3	38.33		1.72	6.34	10.54	0.54	0.00	0.17	0,63	1.05	0.05	0.00
	Taxi In/Idle	5.3	11.33	2	42.20	1.79	63.78	0.54	0.00	5.07	0.21	7.66	90.0	0.00
	T&G Level	1.4	38.33	2	1.2	6.34	10.54	0.54	00.00	0.18	99'0	1.13	90.0	0.00
	GCA Box	5.6	38.33	2	1.7	6.34	10.54	0.54	00.0	1.28	4.71	7.84	0.40	0.00
	Interfacility	1.6	38.33	2	1.0	6.34	10.54	0.54	0.00	0.21	0.78	1.29	0.07	0.0
	Check Idle	18.0	11.33	2	42,20	1.79	63.78	0.54	0.00	17.21	0.73	26.01	0.22	0.0
									Touch and Go	0.39	.1.89	2.35	0.14	0.00
									Full LTO w/ hot ref.		3.81	47.97	0.53	0.00
									Full LTO w/o hot ref		3.72	45.08	0.51	0.00
									Interfacility	7	0.78	1.29	0.07	8.9
						- A - M - M - M - M - M - M - M - M - M			GCA Box	T-10°	1.7.4. m	+Q*/	0.40	0.00

				MODAL	FMISSION	ARS 4 MODAL EMISSION BATES FOR AIRCRAFT AT NAS OCEANA	AIRCRAFT A	TNASOC	FANA					
2	EM			i i			5				177	THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE S		
Aircrait (Engine Model)		(minutes)	((lb/min)/eng)	Engines	19	_	Emission ractor (lib /1000 lb fuell/eng)	etl/eng)			MODA	(lb/mode)	ares	
					VOC (I)	NOx	တ	S02	PM10 (2)	VOC (1)	NOx	00	S02	PM10 (2)
A-4	Taxi Out/Idle	6.3	11.33	-	42.20	1.79	63.78	0.54	0.00	3.11	0.13	4.70	0.04	0.00
(J-52-P-8B)	Take Off	0.4	122.83		0.93	13.05	0.71	0.54	0.00	0.05	0.64	0.03	0.03	0.00
	Climbout	0.4	72.00	-	0.58	10.10	3.00	0.54	00.0	0.02	0.29	0.09	0.02	0.00
	Approach	1.3	38.33	-	1,72	6.34	10.54	0.54	00'0	0.09	0.32	0.53	0.03	0.00
	Taxi In/Idle	6.5	11.33	-	42.20	1.79	63.78	0.54	00.00	3.11	0.13	4.70	0.04	00'0
	T&G Level	1.4	38.33	_	1.72	6.34	10.54	0.54	00'0	60.0	0.34	0.57	0.03	0.00
	Check Idle	18.0	11.33	_	42.20	1.79	63.78	0.54	00'0	8.61	0.37	13.01	0.11	00.0
								-	Touch and Go	0.19	0.95	1.18	0.07	0.00
					1,000,000		-		Full LTO w/o hot ref.	14.97	1.88	23.05	0.26	0.00
F-16	Taxi Out/Idle	6.5	17.67	-	2.26	3.96	19.34	0.54	60'0	0.26	0.45	2.22	90.0	10.0
(F100-PW-100)	_	9.4	736.67		0.10	16,50	55.10	0.54	00'0	0.03	4.86	16.24	0.16	0.00
	Climbout	0.4	173.33	_	0.05	44.00	1.80	0.54	0.83	0.00	3.05	0.12	0.04	90.0
	Approach	1.3	20.00		09:0	11:00	3.00	0.54	0.33	0.04	0.72	0.20	0.04	0.01
	Taxi In/Idle	6.5	17.67	  - 	2.26	3.96	19.34	0.54	0.09	0.26	0,45	2.22	90.0	0.01
	T&G Level	1.4	\$0.00	-	09'0	11.00	3.00	0.54	0.33	0.0	0.77	0.21	0.04	0.02
									Touch and Go	0.08	4.54	0.53	0.11	0.09
									Full LTO w/o hot ref.	1	9,54	21.00	0.36	0.088
	, , , , , , , , , , , , , , , , , , , ,									Bà				
F-5	Taxi Out/Idle	6.5	19.9	2	24.25	1.25	159.00	0.54	00.0	2.10	11.0	13.79	0.05	0.00
(J85-GE-21)	Take Off	0.4	177.50	7	010	5.60	36.40	0.54	00:0	0.01	08.0	5.17	0.08	0.00
	Climbout	0.4	53.33	7	0.25	5.00	21.56	0.54	0.00	0.01	0.21	0.92	0.02	0.00
	Approach	<u>.</u>	20.00	7	2.58	2.92	46.25	0.54	0.00	0.13	0.15	2.41	0.03	0.00
	Taxi In/Idle	6.5	6.67	7	24.45	1.25	159.00	0.54	0:00	2.12	0,11	13.79	0.05	0.0
	T&G Level	<b>4.</b>	20.00	. 7	2.58	2.92	46.25	0.54	00:00	0.14	0.16	2.59	0.03	0.00
	;			i .				:	Touch and Go	0.29	0.53	5.91	80.0	0.00
		:		:			:		Full LIO w/o hot ref.		1.38	36.07	0.22	0.00
E/A 19	Taxi Out/Idle	7.0	10.40		58.18	1 16	137 34	0.40	12.38	8.47	0.17	20 00	0.00	1 80
(F404-GE-400)	Ĭ		10.40	<u>z</u>	58.18	1.16	137.34	0.40	12.38	13.31	0.27	31.42	60.0	2.83
·	•		473.28	. 2	0.13	9.22	23.12	0.40	00'0	0.05	3.49	8.75	0.15	0.00
	Climbout	0.4	143.12	2	0.31	25.16	1.05	0.40	2.81	0.04	2.88	0.12	0.05	0.32
	Approach	: []	66.75	. 7	0,44	8.37	1.78	0.40	01.9	0.08	1.45	0.31	0.07	1.06
	Taxi In/Idle	5.3	10.40	2	58.18	1.16	137.34	0.40	12.38	6.41	0.13	15.14	0.04	1.36
	T&G Level	1.7	00.09	2	0.44	8.37	1.78	0.40	6.10	0.09	1.71	0.36	0.08	1.24
	GCA Box	0.6	00.09	2	0,44	8.37	1.78	0.40	6.10	0.48	9.04	1.92	0.43	6.59
	Interfacility	4.1	85.00	2	0.38	11.78	1.16	0.40	6.10	0.09	2.80	0.28	0.10	1.45
	Check Idle	12.0	10.40	7	58.18	1.16	137.34	0.40	12.38	14.52	0.29	34.28	0.10	3.09
	APU	2.5	3.28	_	0,25	6.25	2.00	0.40	0.22	000	50'0	0.02	0.00	0.00
									Touch and Go	0.20	6.04	0.79	0.20	2.62
									Full LTO w/ hot ref.		8.39	75.74	0.46	7.38
									Full LTO w/o hot ref.	f. 29.57	8.46	78.62	0.47	7.64
									Interfacility	0.09	2.80	0.28	0.10	1.45
									GCA Box		TU O	5	n 43	9

				MODAL	EMISSION RATES FOR AIRCRAFT AT NAS OCEANA	101101								
Aircraft (Engine Model)	Mode (1)	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor	actor uell/eng)			Moda	Modal Emission Rates	lates	- H - H
					(1) 200	NOX	93	802	PM10 (2)	VOCAL	NON		SO?	DMIO (2)
S-3	Taxi Out/Idle	6.5	7.63	2	14.99	1.69	86.06	0.54	3.26	1.49	71.0	9.02	0.03	0 33
(TF34-GE-400)	(TF34-GE-400) Hot Refueling Idle	8.0	7.63	2	14,99	69'1	86.06	0.54	3.26	1.83	0.21	11.11	0.07	040
	Take Off	0.4	63.33	2	0.39	7.51	5.95	0.54	2.11	0.02	0.38	0.30	0.03	0.11
	Climbout	0.4	79.7	2	2.63	3.42	33.57	0.54	6.85	0.02	0.02	0.21	000	0.04
	Approach	1.3	79.7	2	2.63	3.42	33.57	0.54	6.85	0.05	70.0	0.67	0.01	0.14
	Taxi In/Idle	6.5	7.63	2	14.99	1.69	86.06	0.54	3.26	64:1	0.17	9.02	0.05	0.32
	T&G Level	8:1	79'1	2	2.63	3,42	33.57	0.54	6.85	0.07	0.00	0.93	0.01	0.19
	GCA Box	7.5	79.7	2	2.63	3.42	33.57	0.54	6.85	0.30	0.39	3.86	90.0	0.79
			-						Touch and Go	0.14	0.18	1.80	0.03	0.37
									Full LTO w/ hot ref.	4.89	101	30.33	0.21	1.33
		:							Full LTO w/o hot ref.	3.06	0.80	19.23	0.15	0.93
									GCA Box	0.30	0.39	3.86	0.00	0.79
City														
7-12/1C-4	l axi Out/idle	19.0	2.45	2	101.63	1.97	115.31	0.54	00:0	9.46	0.18	10.74	0.05	00.00
(F16A-41)	Take Off	0.5	8.50	2	1.75	7.98	5.10	0.54	0.00	10.0	0.07	0.04	0.00	0.00
	Climbout	2.1	7.88	2	2.03	7.57	6.49	0.54	0.00	0.07	0.25	0.21	0.02	00.00
	Approach	3.7	4.55	2	22.71	4.65	34.80	0.54	00.00	9.76	0.16	1.17	0.02	0.00
	Teor in/Idie	0.7	2.45	2	101.63	1.97	115.31	0.54	0.00	3.49	0.07	3.96	0.02	0.00
	I & C Level	2.0	4.55	2	22.71	4.65	34.80	0.54	00:0	0.41	80.0	0.63	0.01	0.00
	CCA BOX	C./	4.55	2	22.71	4.65	34.80	0.54	0.00	1.55	0.32	2.38	0.04	0.00
	:								Touch and Go	1.25	0.49	2.02	0.05	0.00
		:		- 24					Full LTO w/o hot ref.	13.79	0.73	16.12	0.11	0.00
:									GCA Box	1.55	0.32	2.38	0.04	$\overline{0.00}$
THE THE	Towi Out/Alla	100	000											
CTS8 GE 9E)	Total	0.0	07.7	7 (	150.42	1.43	178.44	0.54	0.00	4.59	0.05	6.28	0.02	0.00
138-OE-81)	I and Oil	0.10	13.10	7	0.40	5.47	9.03	0.54	0.00	0.00	0.00	0.00	0.00	0.00
_	Crimoout	7.0	10.45	7	0.80	4.68	14.13	0.54	0.00	0.10	80.0	0.11	0.03	0.00
	Approach	7.7	9.68	2	1.12	4.47	17.28	0.54	0.00	0.13	0.53	2.06	90.0	0.00
	l axı In/Idle	7.0	2.20	2	130.42	1.43	178.44		0.00	4.02	0.04	5.50	0.02	0.00
									Full LTO w/o hot ref.	8.84	0.71	13.94	0.13	0.00
									.03					:
-34	Taxi Out/Idle	6.5	1.92	-	50.17	2.43	64.00	0.54	0.00	0.63	0.03	0.80	0.01	0.00
(PT6A-25)	Take Off	0.4	7.08	_	0.00	7.81	1.01	0.54	00.0	0.00	0.02	0.00	0.00	0.00
	Climbout	0.4	29.9	-	0.00	7.00	1.20	0.54	0.00	000	0.02	0.00	0.00	0.00
	Approach	1.3	3.58	_	2.19	8.37	23.02	0.54	0.00	10'0	90.0	0.11	00.0	0.00
	Taxi In/Idle	6.5	1.92	-	50.17	. 2.43	64.00	0.54		.0.63	0.03	08.0	0.01	0.00
				013		** Cont. # 10 10 10 10 10 10 10 10 10 10 10 10 10			Till I TO m/o bet me		- Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of the Contract of			

Table F-32 ARS 4

# MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA

Aircraft	Mode	Time in Mode	Fuel Flow	Engines		Emission Factor	actor		Modal	Modal Emission Rates	ates	
(Engine Model)		(minutes)	Ξ	)		(llb/1000 lb fuel]/eng)	rel]/eng)			(lb/mode)		
					VOC (I) NOX	03	S02	PM10 (2)	VOC (I) NOX	ည	S02	PM10 (2)
T-2	Taxi Out/Idle	6.5	9.33	2	11.86 3.68	111.86	0.54	0.00		13.57	0.07	0.00
(185-GE-2)	Take Off	0.4	48.17			21.56	0.54	00.00	0.02 0.25	0.83	0.02	0.00
(i ) )	Climbout	0.4	35.92			28.38	0.54	00.00		0.82	0.02	0.00
	Approach	1.3	17.42	2	2.40 4.02	63.53	0.54	00:00		2.88	0.02	0.00
	Taxi In/Idle	6.5	9.33			111.86	0.54	00:0	1.44 0.45	13.57	0.07	0.00
								Full LTO w/o hot ref.	3.02	31.66	0.19	0.00
		T								moore		
F-2/C-2	Taxi Out/Idle	0.61	86.6	2	19.24   3.53	30.11	0.54	00.0	7.30 1.34	11.42	0.20	00.0
(TS6-A-16)	Take Off	0.5	36.98	2		9.65	0.54	0.00	0.01 0.39	0.02	0.02	0.00
(21 21 22)	Climbout	2.1	36.98	2	0.14 10.45	0.65	0.54	0.00	0.02	0.10	0.08	0.00
	Approach	3.7	33.27	2	100	0.42	0.54	0.00		0.10	0.13	0.00
	Taxi In/Idle	7.0	86.6	2	19.24 3.53	30.11	0.54	0.00		4.21	0.08	0.00
	T&G Level	1.6	15.00	2		4.54	0.54	0.00	0.05 0.31	0.22	0.03	0.00
								Touch and Go	0.11 4.38	0.42	0.24	0.00
								Full LTO w/o hot rel	. 10.05	15.85	0.52	0.00
			_						Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Constitution of the Consti			

Jotes: F-67

(1) Aircraft VOC reported as HC in the form CHy/x

(2) Emission factors equal to 0.00 for PM10 indicate that no factor has been determined (AESO 1996).

(3) Emission factors from AESO Report Number 6-90 and USEPA AP-42.

(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Modal emission rates calculated from data provided by AESO.

(6) T&G, GCA Box and Interfacility level flight TIMs based on flight track profile speeds and distance for F-14, E-2/C-2, F/A-18 and S-3 aircraft. Level TIMs for C-12s and TC-4s were assumed to be the same as E-2/C-2 All other aircraft are assumed to have the same level TIMs as F-14s.

(7) Modal emission rates for T&G operations include approach, climbout, and T&G level modes only.

(8) Modal emission rate for full LTO w/o hot refueling includes APU use (F/A-18 only) and check idle mode.

(9) Modal emission rate for full LTO w/hot refueling does not include APU use (F/A-18 only) or check idle mode.

(10) GCA box and interfacility mode emission rates are presented only for aircraft that conduct low-altitude operations between NAS Oceana and NALF Fentress.

(11) F-14B and F-14D have the same engine types, and therefore, have identical emission rates.

(12) TC-4s are assumed to have the same emission rates as C-12s.

(13) FCLP mode is included in T&G since flight modes are similar.

Key:

VOC = volatile organic compounds LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle NOx = oxides of nitrogen LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle CO = carbon monoxide T&G = touch and go

SO2 = sulfur dioxide GCA = ground control approach
PM10 = particulate matter Interfacility = low altitude operat

Interfacility = low altitude operations between NAS Oceana and NALF Fentress

AESO = Aircraft Environmental Support Office

TIM = time in mode

			<b>◆</b>	IRCRAFT	ARS 4 AIRCRAFT EMISSIONS AT NAS OCEANA	AT NAS OC	EANA					
				FO	FOR 1993 AND 1996-1999	996-1999						
Type of	operation	Number of		ω.	ION	133	2	Ω	S02	12	PR	PMIO
Aircraft		Operations/Year per operat	r per operation (lb)	Total (TPY)	per operation (Tb)	Total	per operation	Total	per operation	Total	per operation	Total
1993 F-14A		3,116	27.74	43,22	6,69	15.10	55.80	86.94	0.96		0 54	14 87
	Full LTO w/o hot ref.	9,349	36.41	170.19	10.58	49.45	71.12	332.43		5.20	12.01	56.16
	Touch&Go	15,236	9065	4.91	6.00	45.70	1.46	11.10	0.26	1.98	3.37	25.66
	GCA Box	2,178	2.06	2.24	14.93	16.26	4.77	5.19	0.75	0.82	11.10	12.08
	Interfacility	2,164	0.34	0.37	2.46	2.67	0.79	0.85	0.12	0.13	1.83	86 1
E IAB	F. II T TO / L	7 1 7										:
9+1-1	Ī	2,138	4.25	4.24	18.79	20.09	18.87	20.17	0.95	1.02	19.51	17.81
1	Touch 8.Co	0,414	2.23	577	19.76	63.38	24.70	79.20	1.14	3.66	21.02	67.39
	1 ouch&Go	10,452	0.32	36. -	12.83	67.03	69.0	3.60	0.37	1.92	3.64	19.04
	UCA BOX	1,494	1.18	0.88	10.88	8-13 	2.04	1.52	0.67	0.50	7.59	5.67
	Intertaciiity	1,485	61.0	0.14	1.79	1.33	0.34	0.25	0.11	0.08	1.25	0.93
A-A	Eull I TO w/ hot ref	3 350	21.10	20.03			100		k			
	Full I TO m/o Fot ref	19001	87.16	97.74	10'0	0.38	47.97	80.37	0.53	0.89	0.00	0.00
	Tuil LIO W/0 liot let.	150,01	17:67	147.10	3.72	18.72	45.08	226.57	0.51	2.56	0.00	0.00
:	Louch&Go	10,380	85.0	21.0	68'1	15.51	2.35	19.28	0.14	1.17	00.0	0.00
	UCA BOX	2,341	1.28		4.71	5.52	7.84	9.17	0.40	0.47	00.00	0.00
	Interraciility	7,520	120	0.25	0.78	0.30	1.29	1.50	0.07	0.08	00.0	0.00
- <b>F V</b>	Eull I TO w/a hat raf	7 150	6071		**			ia G				
-	Tall E10 W/0   01161	4,109	/4.7	17.15	1.88	 14.	23.05	48.05	0.26	0.54	0.00	0.00
!	I ouchæco	3,096	61.0	0.50	0.95	2.41	1.18	3.00	0.07	0.18	00:00	0.00
F-16	Full LTO w/o hot ref	936	05.0	0.28	0 <4	A AK	21.00	0.63	72.0	: : :	10	.0
:	Touch&Go	1144	0.08	0.08	- 1 S V	7.50	52.00	0.00	0.00	7 0 7	0.03	0.U4
						£	2.0	05.0	1	0.00	0.09	CO.O.
F-5	Full LTO w/o hot ref	808	4 38	12	38	7 S. A.	34.07	14 57	0.33	200		<u> </u>
	Touch&Go	988	0.20	FLU	0.53	NC O	70.00	70.41	77.0	0.09	0.00	0.00
		3			200	27.0	2.21	76.7	80.0	0.04	0.00	00.0
TC-4	Full LTO w/o hot ref	638	13.79	4.40	0.73	11.21	15 15	5 1 A		0.03	ic ,c	ò
	Touch&Go	780	1.25	0.49	0.49	0.19	202	0.79	0.05	0.03	8.6	300
	•										8	5
UH-3H	Full LTO w/o hot ref.	862	8.84	2.92	0.71	0.23	13.94	4.61	0.13	0.04	00.0	00.00
7.13	Eull I TO min for sea	126	Vr t.	80	<b>**</b>	XX X	10	ie ie				
7	Full E1O W/0 flot ret.	107	2,7%	1.80	6,.0	60.0	16.12	2.10	0.11	0.01	0.00	0.00
	1 oncucco	445	1.25	0.28	0.49	0.11	2.02	0.45	0.05	0.01	0.00	0.00
7.7	Full I TO w/ hot ref	<u>870</u>	00.7	512	× 3 × 3 × 3 × 3 × 3 × 3 × 3 × 3 × 3 × 3		** **	X X X	K	K	. 4	4
	Full I TO w/o hot raf	0.70	70.7		1,01	1 6	20.33	07.61	0.21	0.09	1.33	0.58
	Touch P.Co.	1 205	3.00	1.55	0.80	C.55	19.23	8.37	0.15	90.0	0.93	0.41
	i oucilecto	267,1	* 6.	\$0.00 0.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.	0.18	77.0	08.1	1.17	0.03	0.02	0.37	0.24
	GCA BOX	675,1	0.50	. 0.20	0,39	0,26	3.86	2.55	90:0	0.04	0.79	0.52
T-2C	Full 1.TO w/o hot ref	1.418	400	- P1 c	87	104	22.16	27.75	0.0	11.0	S	10
						3	00.10	C+:77	0.19	0.14	00.0	00.0
T-34	Full LTO w/o hot ref	1.040	7 74	77.0								
			20 - CONT. C. C. C. C. C. C. C. C. C. C. C. C. C.	200	からない。これは、これのできる。		- 171	080	0.05	0.01		5



This of Operation   Number of Operation   Number of Operation   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   National Attendary   Nation				-		ARS 4	ARS 4						
Type of Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operatio					AIRCRAFT	EMISSIONS A R 1993 AND 1	AT NAS OCI 996-1999						
After that   After that   After operation   Color   First   After operation   Color   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City   City	Typ		Number of	0	$\omega_2$	)N	Х	C		35	72	Ь	Ξ
F-14A Full Trow/blatet 2405 1714 1515 160 103 110 160 151 116 160 160 116 160 160 160 116 160 160	Airc	raft	Operations/Yea	r per operation		per operation (1h)	Total	per operation (Ib)	Total (TPV)	per operation (Ib)		per operation (Ib)	_
Full LTO w/o brief   7216   354   13156   053   3518   7112   23558   111   412   10046670   12,331   0565   2358   6500   359   146   888   116   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   035   0		-		27.74	33.36	9.69	11.65	55.80	67.10	0.96	1.16	9.54	_:
Touch&Co   12,311   0,655   3,595   6,000   14,6   8,98   0,25   1,60   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01   1,01		Full LTO w/o hot rei	<u> </u>	36.41	131.36	10.58	38.17	71.12	256.58	11.11	4.02	12.01	
CGCA Box         1,048         2,06         1,038         1,439         7,18         4,17         2,50         0.75         0.05           Full LTO w/hortert         1,788         4,23         3,57         8,79         62,4         2,18         0.79         0.70         0.12         0.11           Full LTO w/hortert         1,788         4,23         3,57         8,79         62,4         2,75         0.37         1,29         0.03           Full LTO w/hortert         5,189         3,53         1,29         0.32         1,18         0.03         0.37         0.37         1,29         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.04         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03         0.03		Touch&Go	12,331	0.65	3.98	90'9	36.99	1.46	86.8	0.26	09.1	3.37	
Full LTO w/hot ref.   1,788   4.25   3.67   8179   16.24   18.87   16.30   0.95   0.82     Full LTO w/hot ref.   1,728   4.25   3.67   8179   16.24   18.87   16.30   0.95   0.82     Full LTO w/hot ref.   1,728   4.25   3.67   12.83   5.123   2.470   6.402   1.14   2.96     Full LTO w/hot ref.   1,289   0.19   0.12   1.19   1.14   0.34   0.21   0.11   0.07     Full LTO w/hot ref.   1.269   0.19   0.12   1.79   1.14   0.34   0.21   0.11   0.07     Full LTO w/hot ref.   1.256   0.29   2.355   3.72   3.45   3.45   3.45   3.45   0.19   0.19     Full LTO w/hot ref.   4.41   2.83   6.25   8.39   1.85   7.574   16.59   0.45   0.10     Full LTO w/hot ref.   4.44   3.86   0.74   0.07   0.01     Full LTO w/hot ref.   4.44   3.86   0.74   0.07   0.00     Full LTO w/hot ref.   1.22   2.95.7   19.54   8.46   8.39   1.80   0.21   0.00     Full LTO w/hot ref.   4.44   3.48   1.18   1.00   0.00   1.10   0.00     Full LTO w/hot ref.   1.57   3.79   1.157   0.73   0.65   0.01     Full LTO w/hot ref.   1.57   3.79   1.157   0.70   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   1.57   0.30   0.00     Full LTO w/hot ref.   1.57   3.79   0.00   0.00     Full LTO w/hot ref.   1.57   3.79   0.00   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   3.79   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot ref.   1.57   0.00     Full LTO w/hot		GCA Box	1,048	2.06	1.08	14.93	7.83	4.77	2.50	0.75	0.39	11.10	
Fill LTO w/ hot ref 1,728 4.75 1.67 879 1.674 887 1.630 0.95 0.82 Fill LTO w/ hot ref 1,728 5.33 14.34 19.76 5.123 24.70 64.02 1.14 2.96 0.20 0.20 0.20 0.20 0.35 0.35 1.13 0.35 1.14 0.96 2.75 0.37 0.37 0.30 0.30 0.35 0.35 0.35 0.35 0.35 0.35		Interfacility	1,768	0.34	0.30	2.46	2.18	0.79	0.70	0.12	0.11	1.83	
Full LTO w/o hot ref.   1,788   4,25   3,67   1879   16,24   1887   16,30   0.95   0.82     Full LTO w/o hot ref.   5,185   3,53   14,34   1976   51,75   0.40   0.40   0.40     Touch&Cot   5,185   0.35   14,34   1976   1,79   0.40   0.70   0.70     Touch&Cot   5,86   1,18   0.35   1.88   3,19   2.04   0.65   0.67   0.20     Full LTO w/o hot ref.   6,86   29,27   23,95   23,35   23,35   3,14   0.14   0.14     Full LTO w/o hot ref.   1,310   0.21   0.03   0.15     Full LTO w/o hot ref.   1,32   23,57   1,32   23,57   1,32   1,33   0.15     Full LTO w/o hot ref.   1,32   23,57   1,32   0.15   0.00     Full LTO w/o hot ref.   1,67   1,32   0.25   0.05   0.00     Full LTO w/o hot ref.   1,67   1,37   1,37   0.05   0.00     Full LTO w/o hot ref.   1,67   1,37   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00   0.01     Full LTO w/o hot ref.   1,67   1,37   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00   0.01     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,50   0.00     Full LTO w/o hot ref.   1,67   1,50   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   1,57   0.00     Full LTO w/o hot ref.   1,67   0.00     Full LTO w/o hot ref.   1,67   0.00     Full LTO w/o hot ref.   1,60   0.00     Full LTO w/o hot ref.   1,60   0.00     Full LTO w/o hot ref.   1,60   0.00     Full LTO w/o hot ref.   1,60   0.00     Full LTO w/o hot re												:	
Full LTO w/o hot ref   5185   533   1434   1976   5123   2470   6402   114   296   1700 w/o hot ref   5185   5117   0.689   2.75   0.37   1.47   1.269   0.15   0.15   0.15   0.15   0.05   0.05   0.07   0.00   0.07   0.00   0.07   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0	F-14			4.25	3.67	18.79	16.24	18.87	16.30	0.95	0.82	16.67	
Touch&Go   7979   0.33   1.28   5111   0.66   2.75   0.37   1.47     Touch&Go   266   0.19   0.15   0.13   1.79   1.79   1.18   0.34   0.20     Full LTO w/ hot ref.   3.56   2.57   2.35   3.81   1.04   4.79   1.308   0.51   0.15     Full LTO w/ hot ref.   3.56   0.19   0.15   1.79   1.70   1.308   0.51   0.15     Full LTO w/ hot ref.   3.56   0.19   0.22   1.80   2.33   2.33   3.14   0.14   0.19     Full LTO w/ hot ref.   1.356   0.23   0.24   4.79   1.308   0.51   0.15     Full LTO w/ hot ref.   1.356   0.35   0.35   1.80   2.35   1.80   0.24   0.07   0.01     Full LTO w/ hot ref.   1.32   2.357   0.24   0.35   0.35   0.15     Full LTO w/ hot ref.   1.32   2.357   0.35   0.35   0.35   0.35     Full LTO w/ hot ref.   1.32   2.357   0.35   0.35   0.35   0.35     Full LTO w/ hot ref.   1.32   2.357   0.35   0.35   0.35   0.35     Full LTO w/ hot ref.   1.32   2.357   0.35   0.35   0.35   0.35     Full LTO w/ hot ref.   1.484   3.06   0.74   0.80   0.19   0.15   0.05     Full LTO w/ hot ref.   1.677   1.379   1.157   0.74   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   1.157   0.73   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   1.35   0.35   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.18   0.070   1.394   0.00   0.13   0.00     Full LTO w/ hot ref.   1.677   1.379   0.18   0.05   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.18   0.05   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.18   0.05   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.18   0.05   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.35   0.35   0.35   0.05     Full LTO w/ hot ref.   1.677   1.379   0.35   0.35   0.05   0.05     Full LTO w/ hot ref.   1.677   1.379   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35   0.35		Full LTO w/o hot rea	ļ.,	5.53	14.34	19.76	51.23	24.70	64.02	1.14	2.96	21.02	
GCA Box         386         118         0.35         10.88         3.19         2.04         0.60         0.67         0.20           Interfacility         1.269         0.19         0.12         1.79         1.14         0.34         0.21         0.01           Full LTO w/hot ref.         345         31.18         8.50         3.81         1.04         47.97         13.08         0.53         0.15           Full LTO w/hot ref.         1.636         29.27         23.95         1.89         1.89         0.53         0.15           Full LTO w/hot ref.         4.81         1.28         0.24         4.71         0.590         7.84         1.49         0.40         0.08           Full LTO w/hot ref.         4.81         1.28         0.24         4.71         0.59         7.84         0.40         0.09           Full LTO w/hot ref.         1.322         2.93         1.85         7.34         1.65         0.07         0.01           Full LTO w/hot ref.         1.322         2.934         0.29         0.24         8.77         0.73         0.05         0.19         0.07         0.01           Full LTO w/hot ref.         1.344         4.89         1.18         1.04 </td <td></td> <td>Touch&amp;Go</td> <td>7,979</td> <td>0.32</td> <td>129</td> <td>12.83</td> <td>51.17</td> <td>69.0</td> <td>2.75</td> <td>0.37</td> <td>1.47</td> <td>3.64</td> <td></td>		Touch&Go	7,979	0.32	129	12.83	51.17	69.0	2.75	0.37	1.47	3.64	
Full LTO w/ hot ref.   345   31.18   8.50   8.81   1.04   47.97   13.08   0.53   0.15     Full LTO w/ hot ref.   16.56   25.27   23.55   17.2   3.55   45.08   36.88   0.51   0.42     Coch Box   2.566   0.39   0.52   1.89   2.53   3.14   0.01   0.09     Coch Box   2.566   0.39   0.52   1.89   2.53   3.14   0.01   0.09     Coch Box   2.566   0.39   0.52   1.89   0.54   0.05   0.00     Full LTO w/ hot ref.   1,322   25.57   15.54   8.65   0.15   0.05     Full LTO w/ hot ref.   484   4.89   1.18   1.01   0.24   30.33   7.33   0.21   0.05     Full LTO w/ hot ref.   484   3.06   0.74   0.00   0.19   0.00     Full LTO w/ hot ref.   6.57   8.84   0.00   0.19   0.00     Full LTO w/ hot ref.   1,577   13.79   11.57   0.73   0.65   0.15   0.00     Full LTO w/ hot ref.   1,577   13.79   1.15   0.23   0.05     Full LTO w/ hot ref.   1,577   13.79   1.15   0.73   0.05     Full LTO w/ hot ref.   1,577   13.79   1.15   0.73   0.05     Full LTO w/ hot ref.   1,577   13.79   1.15   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   1.15   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   1.15   0.73   0.65   0.15   0.00     Full LTO w/ hot ref.   1,677   13.79   1.15   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   0.73   0.65   0.11   0.00     Full LTO w/ hot ref.   1,677   13.79   0.73   0.05   0.00     Full LTO w/ hot ref.   1,677   13.79   0.75   0.05   0.00     Full LTO w/ hot ref.   1,677   13.79   0.75   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,677   0.00   0.00     Full LTO w/ hot ref.   1,670   0.00		GCA Box	586	80	0.35	10.88	3.19	2.04	09'0	0.67	0.20	7.59	-
Full LTO w/ hoi ref.         345         318         850         381         1 d4         4797         1308         6.53         0.15           Full LTO w/o hoi ref.         1,636         39.27         23.55         3.77         3.68         36.88         0.51         0.42           Full LTO w/o hoi ref.         2,666         0.39         0.52         1.89         2.53         3.14         0.14         0.19           GCA Box         381         1.28         0.24         4.71         0.90         7.84         1.49         0.04         0.08           Interfacility         379         0.21         0.04         0.78         0.15         0.24         0.07         0.01           Full LTO w/o hoi ref.         4.41         2.83         6.25         8.39         1.85         7.574         16.69         0.47         0.01           Full LTO w/o hoi ref.         4.84         4.89         1.18         1.03         0.29         6.04         8.37         7.33         0.21         0.05           Full LTO w/o hoi ref.         4.84         4.89         1.18         1.80         0.73         0.01         0.09         1.80         0.01         0.04           Full LTO w/o hoi re		Interfacility	1,269	0.19	0.12	1.79	1.14	0.34	0.21	0.11	0.07	1.25	•
Full LTO w/hoir ref         345         31.18         8.50         3.81         1.04         47.97         13.08         0.53         0.15           Full LTO w/hot ref         1,636         23.27         23.95         3.72         3.05         45.08         36.88         0.531         0.42           GCA Box         2.660         0.39         0.24         4.79         0.90         7.84         149         0.40         0.08           Interfacility         3.79         0.21         0.04         0.78         0.15         1.29         0.24         0.07         0.01           Full LTO w/ho hot ref         1.322         29.57         19.54         8.46         5.59         78.62         51.96         0.47         0.01           Full LTO w/ho hot ref         1.322         29.57         19.54         8.46         5.59         78.62         51.96         0.10           Full LTO w/ho hot ref         484         4.89         1.18         1.01         0.24         0.05         0.15         0.05           GCA Box         371         0.14         0.07         0.18         0.09         1.80         0.35         0.01           Full LTO w/o hot ref         1.677         1.37<	· !												-
Full LTO w/o hot ref   1,636   29277   2395   3772   3.05   45.08   36.88   0.51   0.42     Touch&Coo	Y.			31.18	8.50	3.81	1.04	47.97	13.08	0.53	0.15	0.00	
Touch&Go         2,566         0.39         0.32         189         2.53         2.35         314         0.14         0.19           GCA Box         381         1.28         0.24         4.71         0.90         7.84         149         0.40         0.08           Interfacility         379         0.21         0.04         0.78         0.15         0.24         0.07         0.01           Full LTO w/ hot ref.         1,322         29:57         19:54         8.46         5:59         78:74         16:69         0.46         0.10           Full LTO w/ hot ref.         1,322         29:57         19:54         8.46         5:59         78:74         16:69         0.46         0.10           Full LTO w/ hot ref.         1,322         29:57         19:54         8.46         8.77         0.79         1.15         0.05           Full LTO w/ hot ref.         484         3.06         0.74         0.80         0.19         19:23         4.65         0.15         0.04           GCA Box         3.71         0.36         0.07         0.19         19:23         4.65         0.15         0.05           Full LTO w/o hot ref.         1,67         1.57         0		Full LTO w/o hot re:	_	29.27	23.95	3.72	3.05	45.08	36.88	0.51	0.42	00.0	
GCA Box         381         128         024         471         0.90         784         149         0.40         0.08           Interfacility         379         0.21         0.04         0.78         0.15         1.29         0.24         0.07         0.01           Full LTO w/h for ref.         1,322         29.57         19.54         8.46         5.59         78.62         51.96         0.46         0.10           Full LTO w/h for ref.         1,322         29.57         19.54         8.46         5.59         78.62         51.96         0.46         0.10           Full LTO w/h for ref.         4.84         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/h for ref.         4.84         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/h for ref.         4.84         3.06         0.19         192.3         0.85         0.15         0.05           GCA Box         371         0.14         0.07         0.19         1.92         0.72         0.06         0.01           Full LTO w/o hot ref.         1,677         1.379		Touch&Go	2,666	0.39	0.52		2.53	2.35	3.14	0.14	0.19	0.00	
Full LTO w/o hot ref		GCA Box	381	1.28	0.24	4.71	06.0	7.84	1.49	0.40	80.0	0.00	
Full LTO w/ hot ref.         441         28.36         6.25         8.39         1.85         73.74         16.69         0.46         0.10           Full LTO w/o hot ref.         1,322         239.57         19.54         8.46         5.59         78.62         51.96         0.47         0.10           Full LTO w/o hot ref.         1,932         239.57         19.54         8.77         7.35         0.20         0.29           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.05           GCA Box         371         0.14         0.07         0.18         0.09         1.80         0.07         0.15         0.06         0.01           Full LTO w/o hot ref.         1.677         13.79         0.15         0.73         0.06         0.13         0.06         0.19         0.06         0.19		Interfacility	379	0.21	0.04	0.78	0.15	1.29	0.24	0.07	0.01	0.00	
Full LTO w/ hot ref.         441         28.36         6.25         8.39         1.85         75.74         10.09         0.40         0.10           Full LTO w/ hot ref.         1,322         29.57         19.54         8.46         5.59         78.62         51.96         0.47         0.10           Touch&Go         2,904         0.20         0.29         6.04         8.77         0.79         115         0.20         0.29           Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.03         0.01           GCA Box         371         0.14         0.07         0.18         0.09         1.80         0.72         0.06         0.01         0.01           Full LTO w/o hot ref.         1.677         1.379         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hot ref.         1.677         1.37         0.73         0.66         0.18         2.02         2.79         0.05								100			i d	10	
Full LTO w/o hot ref.         1,322         29.57         1954         8.46         5.59         78.62         51.96         0.47         0.31           Touch&Go         2,904         0.20         0.29         6.04         8.77         0.79         1.15         0.20         0.29           Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         5.06         0.74         0.80         0.19         192.3         4.65         0.15         0.04           GCA Box         371         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         1,677         13.79         11.57         0.71         0.00         15.94         0.00         0.13         0.00           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.66         16.12         15.25         0.11         0.09           Full LTO w/o hot ref.         1,040         1.25         0.56         0.18         2.02         2.79         0.04         0.05           Full LTO w/	F/A	-		28.30	C7-9	8,39	3.	75.74	16.69	0.46	0.10	7.38	
Full LTO w/ hot ref.         484         4.89         1,18         1,01         0.24         30,33         7,33         0,21         0.02         0.29           Full LTO w/o hot ref.         484         4.89         1,18         1,01         0.24         30,33         7,33         0,21         0.05           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         1923         4.65         0.15         0.04           Touch&Go         941         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01           GCA Box         371         0.30         0.06         0.71         0.00         13.94         0.06         0.01           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.66         1.612         13.52         0.11         0.09           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.66         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.34         0.07         1.71         0.09         0.04         0.00           Full LTO w		Full LTO w/o hot re		29.57	19.54	8.46	5.59	78.62	51.96	0.47	0.31	7.64	
Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04           Touch&Go         941         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01           GCA Box         371         0.30         0.36         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         1,677         13.79         11.37         0.73         0.61         16.12         13.52         0.11         0.09           Full LTO w/o hot ref.         1,677         13.79         11.37         0.73         0.64         0.66         13.52         0.11         0.09           GCA Box         1,103         1.35         0.85         0.32         0.18         2.79         0.04         0.05           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	:	Touch&Go	2,904	0.20	67.0	<b>6</b> ,04	8.77	0.79	<u> </u>	0.20	0.29	7977	
Full LTO w/o hot ref.         484         3.06         0.74         0.89         0.19         19.23         4.65         0.15         0.04           Touch&Co         941         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01           GCA Box         371         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.61         16.12         13.52         0.11         0.09           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.61         16.12         13.52         0.11         0.09           GCA Box         1,103         1.35         0.85         0.32         0.18         2.38         1.31         0.04         0.05           Full LTO w/o hot ref.         1.040         1.26         0.66         0.17         0.07         1.71         0.89         0.02         0.01			1	7.80	<b>81 I</b>	IUI	<u>FC 0</u>	30 33	733	0.51	0.03	111	
Touch&Go         941         0.14         0.07         0.18         0.09         1.80         0.85         0.03         0.01           GCA Box         371         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         1,677         13.79         (11.57)         0.73         0.61         16.12         13.52         0.11         0.09           Full LTO w/o hot ref.         1,677         13.79         (11.57)         0.73         0.61         16.12         13.52         0.11         0.09           GCA Box         1,103         1.55         0.85         0.35         0.68         2.02         2.79         0.05         0.06           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	) ! :			3.06	0.74	0.80	0.19	19.23	4.65	0.15	0.04	0.93	
GCA Box         371         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         0         8.84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hot ref.         1,677         13.79         (11.57)         6.73         0.61         16.12         13.52         0.11         0.09           Touch&Go         2,759         1,25         1,72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1,53         0.85         0.35         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	:	Touch&Go	+	0.14	0.07	0.18	60'0	1.80	0.85	0.03	0.01	0.37	
Full LTO w/o hot ref.         0         8 84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.64         16.12         13.52         0.11         0.09           Touch&Go         2,759         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	· · · · · · · · · · · · · · · · · · ·	GCA Box	:	0.30	90.0	0.39	0.07	3.86	0.72	90.0	0.01	67.0	
Full LTO w/o hot ref.         0         8.84         0.00         0.71         0.00         0.13         0.00           Full LTO w/o hot ref.         1,677         13.79         (11.57)         0.73         0.64         16.12         13.52         0.11         0.09           Touch&Go         2,759         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01									:				
Full LTO w/o hot ref.         1,677         13.79         11.57         0.73         0.61         16.12         13.52         0.11         0.09           Touch&Go         2,759         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.35         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	HI.			8.84	0.00	0.71	0.00	13.94	0.00	0.13	00.00	0.00	
Full LTO w/o hot ref         1,677         13.79         11.57         0.73         0.61         16.12         13.52         0.11         0.09           Touch&Go         2,759         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01													
Touch&Go         2,759         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,103         1.55         0.85         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	<u>ن</u>			13.79	11.57	0.73	0.61	16.12	13.52	0.11	0.09	00.0	
GCA Box         1,103         1,55         0.85         0.18         2,38         1,31         0.04         0.02           Full LTO w/o hot ref.         1,040         1,26         0.66         0.14         0.07         1,71         0.89         0.02         0.01		Touch&Go	2,759	1.25	1.2	0.49	99.0	2.02	2.79	0.05	90:0	0.00	
Full LTO w/o hot ref. 1,040 1,26 0.66 0.14 0.07 1.71 0.89 0.02 0.01		GCA Box	1,103	1.55	0.85	0.32	0.18	2.38	1.31	0.04	0.02	0.00	
Full L1O W/o hot ret. 1,040 1,250 0,02 0,14 0,09 1,71 0,89 0,02 0,01								1	000	0			- :
	<u>-</u>		_	07'1	0.00	* *	70.0	I / I	0.89	0.02	0.0	0.00	

	PMIO	Total	(TPY)	7/11	44.28	21.21	5.94	1.65		21.50	81.32	21.70	3.32	1.18		1.63	5.03	3.81		0.32	0.23	0.17	0.15		00.00	0.00	0.00	 00.00
	Ā	per operation	(all)	4.04	12.01	3.37	11.10	1.83	: ##	16.67	21.02	3.64	7.59	1.25	, p	7.38	7.64	2.62		1.33	0.93	0.37	0.79		00.0	00.00	0.00	00.0
	<u>s02</u>	Total	(1PY)	1.10	4.10	1.64	0.40	0.11		1.23	4.42	2.19	0.29	01.0	ic	01.0	0.31	0.29		0.05	0.04	0.01	0.01		60.0	90.0	0.02	0.01
	S	per operation	(an)	0.50	1.11	0.26	0.75	0.12	i c	0.95	1.14	0.37	19.0	0.11	10	0.46	0.47	0.20	N N	0.21	0.15	0.03	90.0		0.11	0.05	0.04	0.02
	0	Total	(1171)	06.33	262.10	9.18	2.55	0.71	24.10	24.33	95.57	4.10	0.89	0.32		16.69	51.96	1.15	 	7.33	4.65	0.85	0.72		13.52	2.79	1.31	0.89
SANA	03	per operation	(ai)	33.00	71.12	1.46	4.77	0.79	0 0	18.8/	24.70	69.0	2.04	0.34		75.74	78.62	0.79	  -  c  c	30.33	19.23	1.80	3.86		16.12	2.02	2.38	1.71
AT NAS OCI 1996-1999	133	Total	1111	27.77	38.99	37.78	8.00	2.22		74.74	76.48	76.38	4.76	L.70		1.85	5.59	8.77		0.24	0.19	0.09	0.07		190	89.0	0.18	0.07
1 able F-53 ARS 4 RCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	XON	per operation	(III) 0.60	2.03	10.58	6.00	14.93	2.46	01.01	10.79	19.76	12.83	10.88	1.79	***	6.39	8.46	6.04		1.01	08:0	0.18	0.39		0.73	0.49	0.32	0.14
AIRCRAFT I FOI		Total	(4.1.1)	ON P	134.18	4.06	1.10	0.31	5.40	3.40	21.40	1.92	0.52	0.18		0.43	19,54	0.29		. 18	0.74	0.07	90'0		11.57	1.72	0.85	99.0
₩	AOC	per operation	77.74		36.41	0.65	2.06	0.34	300	4.23	5.53	0.32	1.18	610	36.06	78.30	29.57	0.20		4.89	3.06	0.14	0.30		13.79	1.25	1.55	1.26
	Number of	Operations/Year per operation	7457	2,50	1/5/1	12,596	1,071	1,806	7 580	2,200	7,739	11,910	875	1,894	177	144	1,322	2,904	YOU	<b>†</b> 0†	484	941	371		1,677	2,759	1,103	1,040
	Operation		Full LTO w/hot ref	3-17-011111	ruli LIO W/o hot ret.	Louch&Go	GCA Box	Interfacility	Enli I TO w/ hot raf	Full CIO W/ Hot let.	Full LTO w/o hot ret.	Touch&Go	GCA Box	Interfacility	Eull TO w/bat and	run LIO W/ not rei.	Full LTO w/o hot ref.	Touch&Go	3	ruii L10 W/ flot rei.	Full LTO w/o hot ref.	Touch&Go	GCA Box		Full LTO w/o hot ref.	Touch&Go	GCA Box	Full LTO w/o hot ref.
	Type of	Aircraft	F-14A						E.14R/D	0,011					E/A 10	L/A-10			r ic	C-6				1	C-12			 T-34
			1661								-						-											

						AKS 4	_						
				₹	AIRCRAFT FOI	FT EMISSIONS AT NAS ( FOR 1993 AND 1996-1999	IRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	EANA			,		
	Type of	Operation	Number of	30A	ω	Z	NOX	Ď	0	202		PN	<b>9</b>
	Aircraft		Operations/Year per operation	per operation	Total	per operation	Total	per operation	Total	per operation	Total	per operation	Total
	E 177	Eall I TO w/ hot ref	1721	(m)	73.87	(01)	(171) X	(110) 55 80		96.0	0.83	9.54	_ ∞
	V+1-1	Full LTO w/o hot ref	5.164	36.41	94.00	10.58	27.31	71.12		1.11	2.87	12.01	
	***************************************	Touch&Go	10,150	0.65	327	6.00	30.44	1.46	İ	0.26	1.32	3.37	17.10
1		GCA Box	1,024	2.06	1.05	14.93	7.65	4.77		0.75	0.38	11.10	5
!		Interfacility	1,260	0.34	0.21	2.46	1.55	0.79	0.50	0.12	0.08	1.83	-
												: :	
<u>i_</u>	F-14B/D	Full LTO w/ hot ref.	2,756	425	5.85	18.79	25.89	18.87	26.00	0.95	1.31	16.67	
<u>i                                     </u>		Full LTO w/o hot ref.	8,268	5.53	22.86	92.61	81.70	24.70	102.10	1.14	4.72	21 02	œ
<u>:</u>		Touch&Go	12,684	0.32	2.03	12.83	81.35	69.0	4.37	0.37	2.33	3.64	7
		GCA Box	906	1.18	0.54	10.88	4.93	2.04	0.92	19.0	0.30	7.59	; ; ; (m)
<u> </u>		Interfacility	2,000	61.0	61.0	621	1.79	0.34	0.34	0.11	0.11	1.25	1.25
-												i i	
<u> </u>	F/A-18	Full LTO w/ hot ref.	3,084	28.36	43.73	8.39	12.93	75.74	1.6.81	0.46	0.71	7.38	
:	:	Full LTO w/o hot ref	9,253	29.57	136.81	8.46	39.15	78.62	363.73	0.47	2.18	7.64	35.35
		Touch&Go	20,327	0.20	2.05	6.04	61.39	0.79	8.05	0.20	2.00	2.62	7
<u>:</u>		GCA Box	617	0.48	0.15	9.04	2.79	1.92	0.59	0.43	0.13	6.59	~
		Interfacility	1,778	60'0	80.0	2.80	2.49	0.28	0.25	0.10	0.08	1.45	
-													
:	S-3	Full LTO w/ hot ref.	484	68'#	1.18	101	0.24	30.33	7.33	0.21	0.05	1.33	
•		Full LTO w/o hot ref.	484	3.06	0.74	08'0	0.19	19.23	4.65	0.15	0.04	0.93	
-	1	Touch&Go	941	<b>0.14</b>	200	0.18	60'0	1.80	0.85	0.03	0.01	0.37	0.17
	:	GCA Box	37.1	030	90.0	0.39	0.07	3.86	0.72	90.0	0.01	6.79	
		:											
	C-12	Full LTO w/o hot ref.	1,677	13.79	11.57	0.73	0.61	16.12	13.52	0.11	60.0	00:00	
		Touch&Go	2,759	1.25	1.72	0.49	0.68	2.02	2.79	0.05	90:0	00:00	_
	:	GCA Box	1,103	1.55	0.85	0.32	0.18	2.38	131	0.04	0.02	0.00	0.0
								1		3	j	) 14 34	,
<u>.                                    </u>	T-34	Full LTO w/o hot ref.	1,040	1.26	99'0	0.14	0.07	1.71	68.0	0.05	0.01	0.00	0.00
						The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s						

		PM10	Total	(TPY)	8.21	11 00	17.10	07.71	7.08		79 66	88.08	73.11	3.44	1 25	1	17.89	55 54	41.92	3.20	2.03		0.32	0.23	0.17	0.15		0.00	0.00	0.00		00.00	322.24
		Nd	per operation	<b>a</b>	9.54	15 01	117	11.10	1 83		16.67	21.02	3.64	7.59	1 25		7.38	7 64	2.62	6.59	1.45		1.33	0.93	0.37	0.79		0.00	00.0	0.00		0.00	:
		20	Total	(TPY)	0.83	787	1.12	0.38	800		1.31	4.72	2.33	0.30	0.11		T.12	3.43	3.14	0.21	0.13		0.05	0.04	10.0	. 10.0	!	0.09	. 90'0	0.02		0.01	22.60
		<u> </u>	per operation	<b>(g</b> )	0.96		96.0	0.75	0.12		0.95	1.14	0.37	19:0	0.11		0.46	0.47	0.20	0.43	0.10		0.21	0.15	0.03	90.0		0.11	0.03	0.04		0.02	
		2	Total	(TPY)	48.02	183.61	7.40	7 44	0.50		26.00	102.10	4.37	0.92	0.34		183.56	571.58	12.65	0.93	0.39		7.33	4.65	0.85	0.72		13.52	2.79	1.31		0.89	1176.85
	SANA	0.3	per operation	<b>a</b>	55.80	71.12	1.46	4.77	0.79		18.87	24.70	69.0	2.04	0.34	-	75.74	78.62	0.79	1.92	0.28		30.33	19.23	1.80	3.86		16.12	2.02	2.38		1.71	
Table F-33	AT NAS OCE 996-1999	1	Total	CEE	8.34	27.31	30.44	7.63	1.55		25.89	81.70	81.35	4.93	1.79		20.32	61.52	96.48	4.38	3.92		0.24	0.19	60.0	0.07		19'0	89.0	0.18		0.07	459.72
I able F-3 ARS 4	FT EMISSIONS AT NAS (FOR 1993 AND 1996-1999)	DN	per operation	<b>a</b>	9.69	10.58	00'9	14.93	2.46		18.79	19.76	12.83	10.88	1.79		8.39	8.46	6.04	9.04	2.80		101	0.80	0.18	0.39		0.73	67'0	0.32		0.14	
	IRCRAFT E FOR	(2)	Total	(TPV)	23.87	94.00	3.27	1.03	0.21	ľ	5.85	22.86	2.05	0.54	0.19		68.72	214.99	3.22	0.23	0.13		1.18	0.74	0.07	90.0		11.57	1.72	0.85		0.66	458.04
	<b>V</b>			(ID	27.74	36.41	0.65	2.06	0.34		4.25	5.33	0.32	I.18	0.19		28.36	29.57	0.20	0.48	0.09		4.89	3.06	0.14	0.30		13.79	1.25	1.55		1.26	
		Number of	Operations/Year per		1,721	5,164	10,150	1,024	1,260		2,756	8,268	12,684	906	2,000		4,847	14,541	31,942	920	2,794		484	484	941	371		1,0//	2,759	1,103	77.0	1,040	109,885
		Operation	<u> </u>		ruil LIO w/ hot ref.	Full LTO w/o hot ref.	Touch&Go	GCA Box	Interfacility		Full LTO w/ hot ref.	Full LTO w/o hot ref.	Louch&Go	GCA Box	Interfacility		Full LTO w/ hot ref.	Full LTO w/o hot ref.	Touch&Go	GCA Box	Interfacility		Full L1O w/ hot ref.	Full LTO w/o hot ref.	Louch&Go	GCA Box	E.0 ( TO )	rull L10 W/o hot ref.	Louch&Go	GCA Box	F.H.1 70/2 Late 2.25	ruit L.I.O W/O hot rer.	
		Type of	AILCLAIL		F-14A						F-14B/D						F/A-18					* *	5-2				11.0	i			T 3/		Lotal
				- Lunus	6661					•												1_							<u> </u>			-	1

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) Number of GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at Oceana.

1997 and 1999 data from Wyte (1997). 1998 data same as 1999 due to same number of aircraft.

(3) 1993 Full LTO and Touch and Go NASO proportioned from air traffic operation records.
(4) 1997 operation data taken from baseline scenario data in Wyle (1997).
(5) A-6 aircraft assumed decommissioned by 1997.
(6) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997).
(7) Aircraft VOC reported as HC in the form CHy/x
(8) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(9) LTOs for GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

VOC = volatile organic compounds CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter NOx = oxides of nitrogen

Key:

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach  $TPY = tons \ per \ year$   $TPY = tons \ per \ year$ LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle

					ADCA	, ,						
				AIRCRAFT	AIRCRAFT EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	AT NALF FEN 1996-1999	TRESS					
Type of	Operation	Number of	) 20A		N	NOX	00	0	802	77	PN	PM10
Aircraft	Type	perations/Yea	per operation		per operation	1	per operation	Total	per operation	Total	per operation	Total
			9	(TEX	<b>a</b>	(TPY)	<b>a</b>	(TPY)	<b>(a)</b>	(TPY)	(qp)	(TPY)
F-14A	Touch&Go	10,511	0.65	3.39	6,00	31,53	1.46	7.66	0.26	1.37	3.37	17.70
F-14B/D	Touch&Go	7,226	0.32	1.17	12.83	46.34	69.0	2.49	0.37	1.33	3.64	13.17
E-2/C-2	Full LTO	1,074	10.05	5.40	6.29	3.38	15.85	8.51	0.52	0.28	0.00	0.00
	Touch&Go	25,058	11'0	1.37	4.38	54.89	0.42	5.29	0.24	3.04	0.00	00.00
												· · ·
A-6	Touch&Go	11,086	0.39	2,16	1.89	10.50	2.35	13.05	0.14	0.79	00.00	0.00
Total		54,955		13.48		146.63		37.00		6.81		30.87
F-14A	Touch&Go	13,124	69.0	423	6.00	39.36	1.46	9:26	0.26	1.70	3.37	22.10
												:
F-14B/D	Touch&Go	9,281	0.32	1.50	12.83	59.52	69:0	3.19	0.37	1.71	3.64	16.91
									-		į	:
E-2/C-2	Full LTO	0	10.05	00:0	679	00:0	15.85	0.00	0.52	0.00	0.00	0.00
	Touch&Go	21,374	0.11	1,17	4.38	46.82	0.42	4.51	0.24	2.59	0.00	00.0
							30.5			:		
9-Y	Touch&Go	1,805	0.39	0.35	1.89	1.1	2.35	2.12	0.14	0.13	0.00	0.00
Total		45,583		7.25		147.41		19.39	:	6.14		39.01
:												
F-14A	Touch&Go	13,406	0.65	4.32	6.00	40.21	1.46	9.77	0.26	1.74	3.37	22.58
				***				i i				
F-14B/D	Touch&Go	13,854	0.32	2.24	12.83	88.85	0.69	4.77	0.37	2.55	3.64	25.24
							- 32			    	:  -  -  -	: :
E-2/C-2	Full LTO	0	10.05	00'0	6.29	000	15.85	0.00	0.52	0.00	0.00	0.00
	Touch&Go	21,374	11.0	1.17	4.38	46.82	0.42	4.51	0.24	2.59	0.00	0.00
E		10/01										

Per operation (Ib) 0.63 0.65 0.32 0.32 0.32 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.0	Table F-34 ARS 4	AIRCRAFT EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	NOX CO	Hon Total per operation	(b) (TPY) (b) (TPY)	6.00 1.46 6.97		12.83 93.74 0.69 5.03	6.04 39.93 0.79 5.24		4.38 46.82 0.42 4.51	209.19	<b>6.00</b> 28.70 1.46 6.97	0,00	14.65	6.04 62.75 0.79 8.23	0.00	4.38 46.82 0.42 4.51	at ve
		AIRCRAFT EM: FOR:		lios Total		3.09	•	2.36	1.33	000	1.17	267	3.09		7.30	2.09	0.00		0.71
Operation         Number of perations/Y           Type         perations/Y           Touch&Go         9,568           Touch&Go         14,616           Touch&Go         21,374           S8,779         58,779           Touch&Go         9,568           Touch&Go         14,616           Touch&Go         9,568           Touch&Go         14,616           Touch&Go         14,616           Touch&Go         12,374           Touch&Go         20,776           Touch&Go         20,776           Touch&Go         20,776           Touch&Go         21,374			ation Number of	perations/Yea			-	-				58,779		_	_				711 77

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) 1993 Touch and Go proportioned from air traffic operation records and number of interfacility flights.
(3) 1997 operation data taken from baseline scenario data in Wyle (1997).
(4) A-6 aircraft assumed decommissioned by 1997.
(5) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997). 1996 and 1998 E-2/C-2 operations assumed same as 1999.
(6) Aircraft VOC reported as HC in the form CHy/x.
(7) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

LTO = landing and takeoff cycle

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach

lb = pounds

TPY = tons per year VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

02/17/98 02

32A-31A  22	Fuel Consumption (gal/yr) (gal/yr) 8960 234 4843 17115 17115 17100 104 897 Wints 14926 3180 41932 712 712 712		Total	ON		B	lh I	SC	30 <u>2</u>	M	PM-10
10w Traciors: (a) AS32A-30A TA-35 MD-3/AS32A-31A TA-75 AS32A-42 IG-75 AS32A-30 Flight Line Electric Power NC8A (b) NC10C (b) NC10C (b) AM47A-4/NCPP-105 (b) AS47A-1 (b) GTC-85 (c) AM32C-17 AM32C-17 AM42M-2	Fuel Consumption (gal/yr) 8960 254 4843 17115 7200 104 897 897 897 41935 7112 7112 7112 7112 7112	64.60 64.60 64.60 64.60 122.00 64.60 122.00 122.00	X-2.0				í	3			
Tow Tractors: (a) ANS32A-30A TA-35 MD-31ANS32A-31A TA-75 ANS32A-42 IG-75 ANS32A-42 IG-75 ANS32A-42 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-76 IG-	8960 8960 234 4843 17115 7200 104 897 3180 3180 41932 712	64.60 64.60 172.00 64.60 172.00 172.00		15/1000 gal	fotal (YPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	16/1000 gal	Total (TPY)
30A VS32A-31A42 Interpretation of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control		25.50 25.50 25.50 25.50 25.50 25.50 25.50									
VS32A-31A  -42  -30 30		64.60 122.00 122.00 122.00	0.29	436.67	96.0	268.50	1.20	31.10	0.14	46.50	0.21
4230 b) (b) (b) ine Electric Power ine Start Units A-4NCPP-105 (b) c-1 (b) ameous: (b)		122.00 64.60 122.00 22.00	10.0	130.054	90.00	758 50	0.03	31.10	0.00	46.30	0.0
423030 b) (b) (b)		64.60 122.00	325	136.00	361	2750.00	37.61	530	00.00	40.30	2.5
-30 -30 (b) (b) (b) -1 (b) -1 (b) -1 (c) -1 (c) -1 11		122.00	560	416.67	35	768 50	10.77	27.17	7.0	46.50	0.0 71.0
30 ine Electric Power b) (b) (b) A-4/NCPP-103 (b) -1 (b) (c) meous: (b) -1.17		122.00	300	146.00		3250.00	0.17	5.70	000	8.77	000
(b)		W. W. W. W. W.	50.0	146.00	200	3250.00	1.46	5.20	0.00	8.27	0.00
(b)											
NC8A (b) NC10C (b) Jei Engine Start Units AM47A-4NCPP-105 (b) ASA7A-1 (b) GTC-85 (c) Miscellameous: (b) AM32C-17 AM32C-17 AM42M-2	14926 3180 41932 41932 712										
NC10C (b)  Jei Engine Start Units  AM47A-4NCPP-105 (b)  AV547A-1 (b)  GTC-83 (c)  Mixcellameous: (b)  AM32C-17  AM42M-2	3180 41932 712 10101	49.23	0.37	604.17	4.51	130.15	0.97	39.73	0.30	42.47	0.32
Jei Engine Start Units AM47A-4/NCPP-105 (b) A/847A-1 (b) GTC-85 (c) Miscellaneous: (b) A/M32C-17 A/M42M-2	41932 712 10101	49.23	80.0	604.17	96'0	130.15	0.21	39.73	90.0	42.47	0.07
A/M47A-4/NCPP-105 (b) A/S47A-I (b) GTC-83 (c) Miscellaneous: (b) A/M32C-17 A/M21T-5 A/M42M-2	41932 712 10101										:
A/S47A-I (b) GTC-83 (c) Miscellaneous: (b) A/M32C-17 A/M21T-5 A/M42M-2	712	49.23	103	604.17	12.67	130.15	2.73	39.73	0.83	42.47	0.89
GTC-83 (c)  Miscellaneous: (b)  AM32C-17  AM211-5  AM42M-2	10101	49.23	20:0	604.17	0.22	130.15	0.05	39.73	10.0	42.47	0.02
Miscellaneous: (b) AM32C-17 AM2TT-5 AM42M-2	_	0.13	00'0	3.88	0.02	14.83	20.0	0.54	00.0	00.00	0.00
Miscellaneous: (b) A/M32C-17 A/M2T1-5 A/M42M-2											
A/M32C-17 A/M27T-3 A/M42M-2	**				Ţ	* * * * * * * * * * * * * * * * * * * *		**	XXX	K	1 2 2
A/M2/1-5 A/M42M-2	2105	49.23	C 6	3.4	4.04	130.15	0.14	39.73	0.04	42.47	0.04
A/M42M-2	280	49.23	700	}	20.5	130.15	0.00	39.73	0.02	42.47	20.0 XX
HI 11.196	8400	415.11	70.0	223.21	77.0	8589 90	16.08	11 51	0.00	13.70	0.02
)	Total		\$.13		26.43		72.65		1.71		2.00
1996 Tow Tractors: (a)											
A/S32A-30A	19000	64.60	0.61	436.67	4.15	268.50	2.55	31.10	0.30	46.50	0.44
1A-35	450	04.60	10:0	430.07	0.10	720 20	0.00	31.10	0.0	46.50	5 5
TA-75 (MOGAS)	1600	10000	010	46.00	0.10	1750 00	7.80	3.10	0.00	40.50 77.8	0.01
A/S32A-42	17000	64.60	0.55	436.67	3.71	268.50	2.28	31.10	0.26	46.50	0.40
JG-75	104	122.00	10:0	146.00	10.0	3250.00	0.17	5.20	0.00	8.27	00.0
A/S32A-30	2900	122.00	0.18	146.00	0.21	3250.00	4.71	5.20	. 10.0	8.27	0.01
Fight Line Electric Power Un	Unifs 12800	EC OF	0.33	61 809	1 87	130 15	0.83	10 71	0.35	45 47	0.37
NC10C(E)	1500	49.73	000	604 17	106	130 15	0.00	10.73	700	45.47	700
							-		<u>.</u>	į į	
Jet Engine Start Units									:.	:	
A/M47A-4/NCPP-105 (6)	37000		160	604.17	11.18	130.15	2.41	39.73	0.74	42.47	0.79
GTC-85 (c)	3000	0.13	000	3.88	10'0	14.83	0.02	0.54	0.00	00.00	00.0
Miscellaneous: (b)	807.6			***	*	4			a v v	41.41	*X X -
A/M32C-17	2400	49.23	8	004.17	0.73	130.15	0.16	39.73	0.05	42.47	0.05
A/M271-5 (air cond.)	2350		20 0	604.17	170	130.15	0.15	59.73	0.05	42.47	0.05
A/M42M-2 (power)	0001		3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2	0.43	130.13	0.10	39.73	0.03	42.47	50.0
HLU-196	3	11.014	100		3	02.89.90	0.11	11.31	0.00	13.70	8.6

	Editional of Cultural Support Equipment at IAAS Oceana										
		YOC	5	XON	X	03	C	SOS	7.7	Md	PM-IO
	Fuel Consumption (gal/yr)	16/1000 gail	Total (TPY)	16/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	16/1000 gal	Total (TPY)
1997 Tow Tractors: (a)											
A/S32A-30A	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8 77	0.0
TA-35	009	64.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
A/S32A-42	23000	64.60	0.74	436.67	\$.02	268 50	3.00	31.10	0.36	46.50	0.01
TA-75	1200	122.00	1.04	146.00	1.25	3250.00	1.95	5.20	000	8.27	000
										:	
Flight Line Electric Power Units										:	:
NC8A (b)	00091	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
NCIUC (b)	0009	49.23	0.15	604.17	181	130.15	0.39	39.73	0.12	42.47	0.13
Jet Engine Start Units											
A/M47A-4/NCPP-105 (b)	45000	49.23		604.17	13.50	130 15	7 93	30.73	08.0	TA 61	200
GTC-85 (c)	3500	0.13	000	380	0.0	14.83	0.03	0.54	0.07	000	0.90
						8	3		0.00	0.00	3
Miscellaneous: (b)											
A/M32C-17	3000	49.23	0.07	604.17	0.91	130.15	0.20	39.73	90.0	42.47	0.06
A/M27T-5	3000	49.23	0.07	604.17	16:0	130.15	0.20	39.73	0.06	42.47	0.06
A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
HLU-196	20	415.11	00'0	223.31	00'0	8589.90	0.09	11.51	0.00	13.70	0.00
	Total		4.57	100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Sept. 100 Se	34.01		18.73		2.20		2.66
1998 Tow Tractors: (a)		2 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 /	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	100				in a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco	5 11 11 11		† †
A/S32A-30A (MOGAS)	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
IA-35	909	64.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
A/352A-42	73000	64.60	0.74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
Flight Line Electric Power Units	nits					:		:			
NICON N	0000							:			
NC107 (B)	10000	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
	;	67.67	OZTO	17.	74:7	50.051	0.52	39.73	0.16	42.47	0.17
Jet Engine Start Units	0000										
A/M4/A-4/NCFF-103 (B)	4/000	49.2.3	1.10	004.17	14.20	130.15	3.06	39.73	0.93	42.47	00.1
(2) 50-215	Once	23	30.0	0.00	100	14.83	0.03	0.54	0.00	0.00	0.00
Miscellaneous: (b)											1
A/M32C-17	4000	49.23	01.0	604.17	121	130.15	0.26	39.73	0.08	42 47	0.08
A/M27T-5	4000	49.23	0.10	604.17	121	130.15	0.26	39.73	0.08	42.47	000
A/M42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
HLU-196	20	415.11	0.00	223.31	0.00	8589.90	60 0	11 41	000	15 70	200
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state of the state of the state of the state of the state of the state of the state of the s	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second 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second second second second second second second second second second second second second second second second second second second secon	A A A A SALIMAN A A A A A A A A A A A A A A A A A A		``	17:71	90:0	13.//	3

Fuel   Consumption (gal/yr)     1999   Tow Tractors: (a)   A/S32A-30A (JP-S)   22400     A/S32A-30   600     A/S32A-42   23000     A/S32A-42   23000     Flight Line Electric Power Units   16000     NC10C (b)   8000     Jet Engine Start Units   47000     GTC-85 (c)   3500     A/M32C-17   4000     A/M32C-17   4000     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M-2   1600     A/M42M		<b>B</b>	missions from	Emissions from Ground Support Equipment at NAS Oceana								
1999   Tow Tractors: (a)			χOΛ		NON		03		203	2	PM-10	10
1999   Tow Tractors: (a)		Fuel Consumption (gal/yr)		Total (TPY)	16/1000 gal	rotal (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
A/S32A-30A (JP-5)       22400       64.60         A/S32A-30       3500       122.00         TA-35       600       64.60         A/S32A-42       23000       64.60         Flight Line Electric Power Units       16000       49.23         NC10C (b)       8000       49.23         Jet Engine Start Units       47000       49.23         AMA7A-4NCPP-105 (b)       47000       49.23         Ainscellaneous: (b)       4000       49.23         Ainscellaneous: (b)       4000       49.23         Ainstrict       4000       49.23         Ainstrict       4000       49.23	Fractors: (a)											
A/S32A-30       3500       122.00         TA-35       600       64.60         A/S32A-42       23000       64.60         Flight Line Electric Power Units       16000       49.23         NC10C (b)       8000       49.23         Jet Engine Start Units       47000       49.23         AM47A-4NCPP-105 (b)       47000       49.23         Aiscellaneous: (b)       4000       49.23         Aixi32C-17       4000       49.23         Aixi32C-17       4000       49.23         Aixi32C-17       4000       49.23	2A-30A (JP-5)	22400	64.60	0.72	436.67	4.89	268.50	3.01	5.20	90.0	8.27	0.09
TA-35       600       64:60         A/S32A-42       23000       64:60         Flight Line Electric Power Units       16000       49:23         NC10C (b)       8000       49:23         NC10C (b)       49:23         AM47A-4NCPP-105 (b)       47000       49:23         AM32C-17       4000       49:23         AM32C-17       4000       49:23         AM42M-2       1600       49:23	2A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
A/S32A-42         23000         64.60           Flight Line Electric Power Units         16000         49.23           NC10C (b)         8000         49.23           NC10C (b)         49.23           AM47A-4NCPP-105 (b)         47000         49.23           GTC-85 (c)         3500         0.13           AM32C-17         4000         49.23           AM2TT-5         4000         49.23           A/M42M-2         1600         49.23	5	009	64.60	0.02	436.67	0.13	268.50	0.08	5.20	0.00	8.27	0.00
Flight Line Electric Power Units         49.23           NC\$A\$ (b)         16000         49.23           NC\$10C\$ (b)         8000         49.23           Jet Engine Start Units         47000         49.23           ĀM47A-4NCPP-105 (b)         3500         0.13           GTC-\$5\$ (c)         3500         0.13           ĀM32C-17         4000         49.23           ĀM42M-2         1600         49.23	2A-42	23000	64.60	0.74	436.67	5.02	268.50	3.09	5.20	90.0	8.27	0.10
Flight Line Electric Power Units         NC8A (b)       16000       49.23         NC10C (b)       8000       49.23         NC10C (c)       49.23         AM47A-4NCPP-105 (b)       47000       49.23         AM32C-17       4000       49.23         AM27T-5       4000       49.23         AM42M-2       1600       49.23											:	
NCBA (b)     16000     49.23       NC10C (b)     8000     49.23       Jet Engine Start Units     47000     49.23       AM47A-4/NCPP-105 (b)     3500     0.13       Aiscellaneous: (b)     4000     49.23       Aixi32C-17     4000     49.23       Aixi2M-2     1600     49.23	t Line Electric Power	- Units										; ;
NC10C (b)         8000         49.23           Jet Engine Start Units         47000         49.23           AM47A-4/NCPP-105 (b)         3500         0.13           GTC-85 (c)         3500         0.13           Miscellaneous: (b)         4000         49.23           A/M42M-2         1600         49.23	4 (b)	!	49.23	0.39	604.17	4.83	130.15	1.04	39.73	0.32	42.47	0.34
Jet Engine Start Units       47000       49.23         AM47A-4NCPP-105 (b)       47000       49.23         GTC-85 (c)       3500       0.13         Miscellaneous: (b)       4000       49.23         AM27T-5       4000       49.23         A/M42M-2       1600       49.23	)C (b)	8000	49.23	0770	604.17	2.42	130.15	0.52	39.73	0.16	42.47	0.17
art Units ICPP-105 (b) 47000 49.23 3500 0.13 Is: (b) 4000 49.23 4000 49.23											:	
AM47A-4/NCPP-105 (b)       47000       49.23         GTC-85 (c)       3500       0.13         Miscellaneous: (b)       4000       49.23         A/M42M-2       1600       49.23	ngine Start Units											
GTC-85 (c)       3500       0.13         Miscellaneous: (b)       4000       49.23         A/M42M-2       1600       49.23	47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	1.00
65: (b) 4000 49.23 4000 49.23 1600 49.23	-85 (c)	3500	0.13	0:00	3.88	0.01	14.83	0.03	0.54	0.00	0.00	0.00
13: (b) 4000 49.23 4000 49.23 1500 49.23		The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa								:		
4000     49.23       4000     49.23       1600     49.23	ellaneous: (b)									i sur-remor-marker		) ;
4000 49.23 1600 49.23	32C-17	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
1600 49.23	27T-5	4000	49.23	0.10	604.17	1.21	130.15	0.26	39.73	0.08	42.47	0.08
	42M-2	1600	49.23	0.04	604.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
20 415.11	<u>961-</u>	20	415.11	000	223.31	0.00	8589.90	0.09	11.51	0.00	13.70	0.00
Total		Total		3.69		34.66		17.22		1.73		1.92

Footnotes:

(a) Emission factors from AP-42 Volume II for gasoline-powered wheeled tractor for TA-75, IG-75, & A/S32A-30 and diesel-powered wheeled tractors for all others.
(b) Emission factors from AP-42 Volume I for Uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301..
(c) Emission factor from USEPA 1992 for aircraft auxilliary power units.

Notes:
(1) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(2) Conversion from lb/MMBtu assuming heating value for JP-5 of 137,000 Btu/gallon.

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			EMIS	SSION RATES FOR SINGLE ENGINE MAINTENANCE RUN-UPS AT NAS OCEANA (IN-FRAME ENGINE TESTING)	FOR SINGLE E	GLE ENGINE MAINTENANCE (IN-FRAME ENGINE TESTING)	TENANCE RU TESTING)	N-UPS AT NA	S OCEANA				
Engine (Aircraft)	Power Setting (1)	Time in Power Setting (1)	Fuel Flow (lb/min)		E	Emission Factor	(aux			(Ib/a)	Emission Rates	3-11m)	
		(minutes)	,	VOC(2)	NOX	03	\$05	PM10	VOCA	NOX	00	502	PM10
TF30-P-412A	Low Power												
(F-14A)	ldle	7.00	15.3	31.42	3.22	55.51	0.40	8.96	3.37	0.35	3.96	0.04	96.0
	75%	12.00	71.7	148	10.74	3.43	0.40	5.70	1.27	9.24	2.95	0.34	4.90
	Total								4.65	9:39	8.91	0.39	5.87
1	Ulak Banan												
<u>.</u> !	nigh rower	10.00	14.3	21.40		1333	27.0	20 0			ļ		
1	74%	75.00	717	201.42	3.22 10.71	33.31	0.40	8.36	18.4	0.49	8.49	90.0	1.37
	100% (Min	00.01	117.5	0.7	1080	38	0.40	3.70	C0'7	57 K	6.15	0.72	10.22
-:	A/B (Z5)	4.00	7.967	0.20	6.39	10.77	0.40	000	0.64	14.05	70.1	1 27	2.30
	Total								906	58.04	50.58	2.52	15.09
F110-GE-400	Low Power												
(F-14B/D)	Idle	5.00	19.5	3.65	2.77	16.60	0.40	12.38	0.36	0.27	1.62	0.04	1.21
	75%	12.50	133.0	97.0	19:61	0.76	0.40	4.30	0.43	32.60	1.26	79.0	7.15
	Total								0.79	32.87	2.88	0.70	8.36
<u>i</u>													-
	High Power												
<u> </u>	Idle	10.00	19.5	3.65	2.7	16.60	0.40	12.38	0.71	0.54	3.24	80.0	2.41
	75%	20.00	133.0	0.26	19.61	0.76	0.40	4.30	0.69	52.16	2.02	90.1	11.44
	IR.	15.00	195.3	0.40	28.63	0.84	0.40	2.81	10.7	83.87	2.46	1.17	8.23
1.	Total	8:	745.0	CIA	77.6	71.67	0.40	0.00	V 40	348	87.39	1.51	0.00
J-52-P-8B	Low Power								3.00	317	11.6%	3.83	80.22
(A-6)	Idle	15.00	11.3	48.96	1.79	63.78	0.40	00.00	8 32	030	10.84	6.07	<u>0</u> 00
1	78-82%	10.00	72.0	0,67	10.10	3.00	0.40	00'0	0.48	727	2.16	0.29	00.0
• .	Total								8.80	7.58	13.00	0.36	0.00
	4 1-31				14 & God and 15 C								
	nign rower	15 00	11.3	78.07	170	63.78	U VU	000	VE 9	26 X	100	10	
-	78-82%	\$ 00	72.0	290	10.10	3.00	0.40	00.00	0.34	2 64	10.01	0.0	0.00
<u>i</u>	94-100%	8.00	122.8	0.93	13.05	0.71	0.40	00.00	160	12.82	0.70	0.30	0.00
	Total								9,45	16.76	12.59	09.0	0.00
F404-GE-400	Low Power	03 2		01 03		137 34	97.0	100	**	***	16	ie ic	
<u> </u>	2/9/	3.50	0.601	34	14.80	001	9	6 10	0.73	0.00	0.70	0.03	0.84
	Total								407	£ 73	0.42	2 10	21.5
								:			2	9	;
-	High Power		1					:				•	
•	Ide	13.00	10.4	58.18	9[1	137.34	0.40	12.38	7.87	0.16	18.57	0.05	1.67
1	76%	8.50	109.0	0.35	14.80	1.09	0.40	4.00	0.32	13.71	10.1	0.37	3.71
	2 19	5.00	143.1	0.31	25.16	1.05	0.40	2.81	0.22	18.00	0.75	0.29	2.01
										The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			

(1) Power setting and time in power setting for F-14 A, F-14B/D, F/A-18 aircraft, and A-6 provided by AESO and COMNAVAIRLANT.

(2) Aircraft VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(4) Aircraft VOC = volatile organic compounds

(5) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Aircraft VOC = volatile organic compounds

(6) Aircraft VOC = volatile organic compounds

(7) Aircraft VOC = volatile organic compounds

(7) Aircraft VOC = volatile organic compounds

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						Table F-37 ARS 4							
			EMISSIC	EMISSIONS FROM SING	LE ENGINI	GLE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	INTENANCE	RUN-UPS AT N	AS OCEAN.				
	Type of	Run-up mode	Number of	AUC	(9)	NOX		03		SO2	7	PMI	2
	Aircraft (Engine) and		Single Engine		Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total	Lb per Single	Total
	Number of Aircraft		Run-ups/yr	뎚	(TPY)	Engine Run-up	(MPX)	Engine Run-up	(TPY)	Engine Run-up	(TPY)	Engine Run-up	(TPY
1993	F-14A (TF30-P-412A)	Low Power	9,617		22.34	626	46.09	16.8	42.83	0.39	1.86	5.87	Z
	08	High Power	274	00.6	123	58.04	7.94	\$0.58	6.92	2.52	0.35	15.09	2.06
		_											
	F-14B/D (F110-GE-400)	_	3,365	0.79	1.33	32.87	55.30	2.88	4.85	0.70	1.18	8.36	14.06
	55	High Power	176	3.07	0.27	171.43	15.11	95.11	8.38	3.83	0.34	22.08	:
	A-6 (J-52-P-8B)	Low Power	10,320	8.80	45.42	7.58	39.09	13.00	67.08	0.36	1.84	00:0	00.00
	98	High Power	292	9.45	1.38	16.76	2.45	12.59	1.84	09:0	60.0	00:00	
			The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa	Total	71.97	7.60	165.99		131.90		5.65		:
1		-											
9661	F-14A (TF30-P-412A)	Low Power	11,180	4.65	25.96	65.6	46,09	8.91	42.83	1 0.39	1.86	5.87	28.21
	. 63	High Power	318	006	143	58.04	194	50.58	669	2.52	0.35	15.09	1
		9											
	F-14B/D (F110-GE-400)	<del>+-</del>	4,221	6.79	1.66	32.87	55.30	2.88	4.85	0.70	1 18	8.36	
	69	High Power	221	3.07	0.34	171.43	13.11	95.11	8.38	3.83	0.34	22.08	<u>1.95</u>
		:											
	A-6 (J-52-P-8B)	Low Power	1,680	0.13	0.11	5.65	4.74	0.42	0.35	0.15	0.13	2.33	1.95
	14	High Power	48	0.22	10.0	18.00	0.43	0.75	0.02	0.29	0.01	2.01	
										:			
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	16.0	0.18	0.02	3.16	
	12	High Power	46	8.54	0.21	40.60	0.99	42.21	1.03	1.09	0.03	7.39	0.18
				Total	30.13		131.19		65.36		3.91		•
1007	E 134 (TE30. D. 4124)	I ow Downer	11 420	788	58.43	1 0 40	54.74	100	20.05	0 30	7.71	202	
	(A21F-1-0611) AF1-1	High Power	375	00.6	1 46	48.04	0.43	50.58	8.77	7.57	0.41	15.00	7.47 7.45
	•	0									;		
	F-14B/D (F110-GE-400)	Low Power	6,302	0.79	2.48	32.87	103.57	2.88	80.6	0.70	2.22	8.36	
	103	<u> </u>	330	3.07	0.51	171.43	28.30	95.11	15.70	3.83	0.63	22.08	3.65
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5.72	0.57	9.70	0.97	0.18	0.02	3.16	
	12	High Power	49	8.54	0.21	40.60	66'0	42.21	1.03	1.09	0.03	7.39	0.18
-	_	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR	The second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th			- T			

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Type of Aircraft   Run-up mode   Number of Aircraft   Single Engine   Number of Aircraft   Single Engine   Single Engine   Sum-ups/yr   So
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(1) Number of maintenance run-ups for F-14A, F-14B/D, and F/A-18 aircraft in 1997 and 1999 are from Wyle (1997). 1993, 1996, and 1998 maintenance run-ups were scaled from 1997 based on number of aircraft stationed at NAS Ocea (2) Maintenance run-ups for A-6 based on actual 1993 data. 1996 data scaled using 1993 data. (3) Aircraft VOC reported as HC in the form CHy/x (3) Aircraft VOC reported as HC in the form CHy/x (4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:



						STATION	Table F-38 STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 4	Table F-38 EMISSIONS A	T NAS OCEAP	VA - ARS 4			ľ.	
Source			1993			1	FOR 1	FOR 1993 AND 1996-1999 1996	5-1999			7661		
Type	YOC	NOX	ည	203	PMI0	20A	NOX	03	202	PMI0	VOC NOX	00	li	202
Stationary Sources:													ŀ	
Boilers	113	32.32	8.31	22.09	3.84	0.78	29,13	7.52	23.76	3.63	0,78   29,13	7.52	İ	23.76
					The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s							1 12		
Generators	0.71	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	19'0	2.11 27.87	7.27	1	3.77
												ł y		
Engine Testing	3.26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	101	2.78	3.73 29.99	39.88		1.25
_		Y					ではまたが							
JP-5 Fuel Handling	99'0	00'0	0.00	0.00	00.0	97-0	0.00	00.0	00.00	0.00	0.54 0.00	000	ì	00.0
												-	!	:
Service Station	19.35	000	0.00	0.00	00.0	4.46	0.00	00.0	00.00	00.0	4.67 0.00	0.00		00.00
Painting	19.30	000	00.0	00.0	00.0	13.29	000	00.0	00.00	0.00	14.00 0.00	00.0		00.00
														:
Construction:	00'0	00.0	00.00	00'0	00.0	000	0.00	00:0	00.00	0.00	00.0	0.00		00.00
						328		1				1		:
Total	7 77	88.09	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85 86.99	54 67		28.78

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			ST	ATIONARY SC	OURCE EMIS	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 4 ROB 1993 AND 1996-1999	OCEANA - ARS	4		
Source			1998			100 - 100 TO		1999		
Type	200	NOX	03	S02	PM10	20A	NON	02	802	PMI0
Stationary Sources:										
Boilers	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
-										
Engine Testing	9.70	54.02	67.01	1.81	9.72	02.6	54.02	67.01	1.81	9.72
JP-5 Fuel Handling	0.81	0.00	0.00	00.0	0.00	06:0	0.00	0.00	0.00	0.00
			The same of the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the same and the sa							
Service Station	6.40	00'0	0.00	0.00	00.00	6.72	0.00	0.00	00.0	0.00
-8									+	
7 Painting	34,12	0.00	0.00	0.00	0.00	41.00	0.00	0.00	00.0	0.00
Construction:	00.0	0.00	0.00	0.00	0.00	1.96	19.50	6.33	1.85	3.55
Total	53.76	109.02	80.96	28.40	15.31	63,01	128.52	87.29	30.25	18.86
						1 Commence of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon		7		· · · · · · · · · · · · · · · · · · ·

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key: VOC = volatile organic compounds

NOx = oxides of nitrogen

CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

02/17/98 **27** PM

				EMISS	EMISSION RATES FO	Table F-39 (TES FOR AIRCRAFT ENGINE TESTS AT NAS OCEANA - ARS 4	Table F-39 T ENGINE TEST	S AT NAS OCI	EANA - ARS 4					
						SINGLE ENGINE IN TEST CELLS	NE IN TEST C	ELLS)						
Engine	Power	Time in Power	Fuel Flow	Calculated Fuel		Em	Emission Factor (3)				Single I	Single Engine Test Emissions	ssions	
(Aircraft)	Setting	Setting (1)	(Ib/min)	Usage (2)		(lp	([lb /1000 lb fuel]/eng)	ng)				(spunod)		
,	)	(minutes)		(gallons/test)	V0C(4)	NOX	9		PM10	VOC (4)	NOK		202	PM10
TF30-P-412A	Idle	28.00	15.33	63.12	31.42	3.22	55.51	0.54	8.96	13.49	1.38	23.83	0.23	3.85
(F-14A)	75%	5.00	71.67	52.70	1.48	10.74	3.43	0.54	7.98	0.53	3.85	1.23	0.19	2.86
,	81%	23.00	77.40	261.79	1.20	16.02	1.62	0.54	7.98	2.14	28.52	2.88	96.0	14.21
1	A/B	22.00	796.67	2577.46	0.20	4.79	10.77	0.54	0.00	3.51	83.95	188.76	9.46	0.00
•	Total	78.00		2955.08					Per Test	99.61	117.70	216.70	10.85	20.91
								April 10 10 10 10 10 10 10 10 10 10 10 10 10						:
F110-GE-400	Idle	24.00	19.50	154.85	3.97	2.74	15.75	0.54	12.38	4.18	2.89	16.58	0.57	13.04
(F-14B/D)	81%	44.00	143.70	929.82	0.26	19.61	0.76	0.54	2.81	1,64	123,99	4.81	3.41	17.71
	93%	25.00	198.22	728.75	0.31	28.53	1.08	0.54	2.81	1.54	141.38	5.35	2.68	13.92
	A/B	11.00	945.05	1528.76	3.75	12.64	44.21	0.54	0.00	38.98	131.40	459.59	5.61	0.00
<del>-</del>	Total	134.00		3342.18					Per Test	46,34	399,66	486.33	12.27	44.73
	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon													
J-52-P-8B	Ground Idle	32.00	11.33	53.32	48.96	.1.79	63.78	0.54	0.00	17.75	0.65	23.12	0.20	00.00
(9-V)	RP	18.00	122.83	325.14	1.08	13.05	0.71	0.54	00.0	2.39	28.85	1.57	1.19	00.00
,	75% Thrust	24.00	72.00	254.12	0.87	10.10	3.00	0.54	00.0	1.50	17.45	5.18	0.93	00.0
	3k Lbs Thrust	25.00	38.33	140.92	66'1	6.34	10.54	0.54	00'0	1.91	× 6.08	10.10	0.52	0.00
	Total	_		773.49					Per Test	23.55	53.03	39.98	2.84	0.00
		-												
F404-GE-400	Idle	52.00	10.40	79.53	58.18	1.16	137.34	0.40	12.38	31.46	0.63	74.27	0.22	6.70
(F/A-18)	80%	34.00	131.60	658.00		18.71	1.17	0.40	6.10	1.48	83.72	5.24	1.79	27.29
	A/B	3.00	473.28	208.80	0.13	9.22	23.12	0.40	00.0	0.18	13,09	32.83	0.57	00.0
	Total	89 00		04K 33	新中三·日本的				Per Tost	11.13	1.P LO	112 34	2.57	13 90

(1) Power setting and time in power setting provided by COMNA VAIRLANT.

(2) Assumes a product density of 6.8 lb/gallon for IP-5.

(3) Data for calculating modal emission rates provided by the Navy Aircraft Environmental Support Office.

(4) Aircraft VOC reported as HC in the form CHy/x

(5) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

A/B Max. = maximum afterburner IRP = intermediate rated power (same as military) 75% = 75% throttle setting

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

### EMISSIONS FROM AIRCRAFT ENGINE TESTING AT NAS OCEANA - ARS 4 FOR 1993 AND 1996-1999 Table F-40

***************************************						SINGLE ENGINE IN TEST CELLS	TEST CELLS)						
Year	Engine	Number of	Number of	100 VOC 12	(2)		NOx	2	00	805	7	PM10	01
	Model	Aircraft	Tests/Year	per test	Total	per test	Total	per test	Total	per test	Total	per test	Total
			(I)	( <b>(I</b> )	(TEV)	(db)	(TPY)	( <b>P</b> )	(TPY)	( <del>a</del> )	(TPY)	(qp)	(TPY)
1993	TF30-P-412A	80	π	99.61	0.76	117.70	4.56	216.70	8.39	10.85	0.42	20.91	0.81
	F110-GE-400	55	99	46.34	1.52	399.66	13,12	486.33	15.97	12.27	0.40	44.73	1.47
	J-52-P-8B	98	83	23.55	96:0	53.03	2.21	39.98	1.66	2.84	0.12	00:0	0.00
			į	Total	3.26		19.89		26.03		0.94		2.28
9661	TF30-P-412A	93	8	99:61	0.89	117.70	\$.30	216.70	92.6	10.85	0.49	20.91	0.94
	F110-GE-400	69	82	46.34	1.91	399.66	16.47	486.33	20.04	12.27	0.51	44.73	1.84
····	F404-GE-400 (4)	12	. 0	33.12	0.00	97.43	0.00	112.34	00.0	2.57	00.00	33.99	00.0
	J-52-P-8B	14	14	23.55	0.16	53.03	0.36	39.98	0.27	2.84	0.02	0.00	0.00
				Total	2.95		22.13		30.07		1.01		2.78
									ì				
1997	TF30-P-412A	95	92	99.61	060	117.70	5.41	216.70	9.97	10.85	0.50	20.91	96.0
	F110-GE-400	103	123	46.34	2.85	399.66	24.58	486.33	29.91	12.27	0.75	44.73	2.75
	F404-GE-400 (4)	12	0	33.12	0.00	97.43	0.00	112.34	0.00	2.57	0.00	0.00	0.00
•				Total	3.75		29.99		39.88		1.25		3.71
!			:										
8661	TF30-P-412A	50	09	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97	180	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	132	298	33.12	4.94	97.43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
				Total	9.70		54.02		67.01		1.81		9.72
			:										
1999	TF30-P-412A	20	09	99.61	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
	F110-GE-400	97	180	46.34	417	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
	F404-GE-400 (5)	132	298	33.12	4,94	97.43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
	J.		-	Total	9.70		\$4.02	i	67.01		1.81		9.72

Number of engine tests per F-14A, F-14B/D, and F/A-18 aircraft from U.S. Navy (1997) and Wyle (1997). Number of A-6 engine tests per aircraft assumed to be the same as F-14A engine tests per aircraft.
 Aircraft engine emissions of VOC reported as HC in the form CHy/x.
 Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
 Adversary squadron engine tests not conducted at Oceana due to lack of F404 test equipment at NAS Oceana.
 Includes adversary squadron test cell events due to installation of F404 test equipment at NAS Oceana.

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter



Table F-41 PARKING LOT CONSTRUCTION (4 LOTS) AND AIRCRAFT APRON - ARS 4

Equipment Exhaust Emissions

	Equipment	Days		Emission	Factors (lb/1000 gal)	00 gal)			EMIS	EMISSIONS (Ibs)		
Equipment List	quantity	Used	NOx	VOC	00	802	PM10	NOX		00	202	PM.
Crane	0	0	403	35.0	82.0	31.2	27	0.0	UU	0.0	00	
Backhoe Loader	2	45	395	39.0	133.0	31.2	27	1777.5	175.5	598 5	7071	2 5
Pan Scraper	1	20	340	19.6	7.76	31.2	27	3400	10,6	7.70	21.0	171
Hi-Liñ	0	0	364	31.0	121.0	31.2	25	00	0.0	)	7.15	0.72
Front-end Loader, wheels		45	403	23.5	94.0	31.2	29	906.8	52.9	211.5	70.2	, y
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	00	700	3 6
Track loader	-	0	391	23.5	94.0	31.2	24	00	D C	00	0.0	2
Grader	2	45	375	43.0	74.3	31.2	22	1687	103.4	334.4	140.4	5 6
Bulldozer	2	45	375	43.0	74.3	31.2	25	1687	193.4	334.4	140.4	
Compactor	9	45	364	31.0	121.0	31.2	24	2457.0	2003	0.14.4	140.4	717
Roller	3	45	364	31.0	121.0	31.2	24	0.727.0	2003	916.9	210.0	70
Paver	-	45	403	23.5	125.0	31.2	29	906 8	0.63	281.3	70.7	707
										C.107	7.07	- 69
hauf trk/cement mixer, mob(gm/	4	45	8.0	2.1	9.93	2.8	2.15	317.2	83.1	101 7	0111	90
haul trk/cement mixer, idl(gm/hr	4	45	13.2	16.2	40.2	0	0	10.5	12.8	31.9	0.0	0.0
							Total, lb/yr	12547.6	1202.5	3916.7	1125.0	899.7
							Total TPV	* · · ·	UZ U	100		,

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Table F-41
NEW BUILDING/ADDITION CONSTRUCTION - ARS 4
Equipment Exhaust Emissions

CONTRACTOR OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF	Faninment	Dave		Emission Fac	nission Factors (lb/1000 gal)	(a)			EMISS	EMISSIONS (lbs)		
EOUPMENT LIST	quantity	Used	NOX		93		PM10	NOx	voc	ខ	802	PM10
Crane	1	120	403	35.0	82.0	31.2	27	2418.0	210.0	492.0	187.2	162.0
Backhoe Loader	2	120	395	39.0	133.0	31.2	27	4740.0	468.0	1596.0	374.4	324.0
Pan Scraner	1	120	340	9.61	7.76	31.2	27	2040.0	117.6	586.2	187.2	162.0
Hi-Lift	2	120	364	31.0	121.0	31.2	25	4368.0	372.0	1452.0	374.4	300.0
Front-end Loader, wheels	-	120	403	23.5	94.0	31.2	29	2418.0	141.0	564.0	187.2	174.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Track loader	0	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Grader		120	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	132.0
Bulldozer	2	120	375	43.0	74.3	31.2	25	4500.0	516.0	891.6	374.4	300.0
Compactor	-	120	364	31.0	121.0	31.2	24	2184.0	186.0	726.0	187.2	144.0
Roller	0	0	364	31.0	121.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Paver	0	0	403	23.5	125.0	31.2	29	0.0	.0.0	0.0	0.0	0.0
	1									;		:
haul trk, mob(em/mi)	7	120	8.0	2.1	9.93	2.8	2.15	1480.2	388.5	1837.3	518.1	397.8
hanl trk. idl(em/hr)	7	120	13.2	16.2	40.2	0	0	48.8	59.9	148.8	0.0	0.0
()	-		Library and the second construction of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	adioa aina Ommanmamamamami ras ann cal m			Total Lb/yr	26447.0	2717.1	8739.6	2577.3	2095.8
							Total TPY	13.22	1.36	4.37	1.29	1.05
				The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon								

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

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### TPY **EMISSIONS SUM** LBS/YR 2232.8 ANNUAL DEMOLITION PARTICULATE EMISSIONS - ARS 4 REMOVAL (LBS) REMOVAL (LBS) ACTIVITY (LBS) VEHICLE Table F-42 DEBRIS STRUCTURE Floor Space (SQ FT) 191,887

2042.6

180.4

8.6

Pushing (bulldozing) PM emission put under site prep spreadsheet Demolition square ft assumed = 10 % of new construction sq ft PM emission from on-site vehicle activity based on sq ft \*EF PM emission from structure takedown based on sq ft \*EF PM emission from debris removal based on sq ft \*EF

Reference EPA-450/2-92-004 (Fugitive Dust document) (all EF's in EPA document converted to english units)

	EANA - ARS 4	EMISSIONS SUM	TPY	0.93
	I AT NAS OCI	EMISSIC	LBS/YR	1868
Table F-42	ANNUAL SITE PREPARATION PARTICULATE EMISSIONS FOR CONSTRUCTION AT NAS OCEANA - ARS	PAN SCRAPING	(LBS) SOIL REMOV(LBS) ETHMOVING (LBS) LBS/YR	444
	LATE EMISSIONS F	ACTIVITY BULLDOZIN PAN SCRAPING PAN SCRAPING	SOIL REMOV(LBS)	704
	ION PARTICU	BULLDOZIN	(LBS)	720
	E PREPARAT	ACTIVITY	DAYS	120
	ANNUAL SIT	ACRES AC		44

Notes:

Acreage estimate based on building sq ft\*2
Estimate activity days for preferred, develop ratio days:acres
Apply ratio to ARS acreages to get activity days
Bulldozing pm emissions based on 8hr/activity day \* EF (EPA 1992)
Soil removal emiss based on VMT/acre \*acres\*EF (EPA 1992)
Earthmoving emiss based on soil removal miles \*3 (BEE)\*EF
EPA 1992 is Fugitive Dust BG document (EPA-450/2-92-004)

	Table F-43			
Total Co	Total Construction Emissions (Exhaust and Dust) - ARS 4	Dust) - ARS 4		
Project/Source	Emi	Emissions (tons/yr)	J.	
Engine Exhaust Emissions	VOC	93	SOx	PM10
Parking Lot Construction	0.60	1.96	0.56	0.45
Building/Addition Const. (total)	1.36	4.37	1.29	1.05
Demolition/Construction Activity				
Mechanical dust Generation	0.00	0.00	00.00	2.05
Total	1.96	6.33	1.85	3.55

Kev:

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide

CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

1993   Source Type	802	EMISSIONS	SUMMA	UNS SUMMAKY - NAS OCEANA AND NALF FENTRESS	CEANA	AND NA	CF FENT	RESS - ARS 4	7			
Source Type         VÖCs         NOx           NAS Oceana:         600.57         353.51           Mobile Sources:         500.57         353.51           Aircraft Operations         500.57         353.51           Total Aircraft         500.57         353.51           Other Mobile Sources:         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           Service Station         0.66         0.00           Painting         19.35         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88				FOR 199	FOR 1993 AND 1996-1999	96-1999			-			
Source Type         VOCs         NOx           NAS Oceana:         600.57         353.51           Mobile Sources:         500.57         353.51           Total Aircraft         500.57         353.51           Total Aircraft         500.57         353.51           Other Mobile Sources:         5.13         26.43           GSE         71.97         165.99           Generators         77.65         199.30           Stationary Sources:         0.56         6.89           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88				(to	(tons per year)	(r)						
Source Type         VOCs         NOX           NAS Oceana:         Abobile Sources:         500.57         353.51           Aircraft Operations         500.57         353.51           Total Aircraft Operations         500.57         353.51           Other Mobile Sources:         5.13         26.43           GSE         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Boilers:         1.13         32.35           Painting         0.66         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	_				1996					1997		
tr ations 500.57 353.51 Sources: 500.57 353.51 Sources: 5.13 26.43 Run-ups 71.97 165.99 Mobile 77.65 199.30 urces: 113 32.32 ells 3.26 19.89 n 19.35 0.00 n 19.35 0.00		PM10	VOCs	NOX	ည	S02	PM10	VOCs	NOX	ဥ	S02	PM10
Mobile Sources:         500.57         353.51           Total Aircraft Operations         500.57         353.51           Other Mobile Sources:         5.13         26.43           GSE         7.197         165.99           Generators         7.165         199.30           Total Other Mobile         7.7.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Boilers:         0.71         8.67           Generators         0.71         8.67           Boilers:         1.13         32.32           Boilers:         0.71         8.67           Boilers:         1.13         32.32           Boilers:         1.13         32.32           Boilers:         1.13         32.32           Boilers:         1.13         32.32           Boilers:         1.13         3.26         19.89           Professionerators         0.66         0.00           Painting:         19.35         0.00           Construction:         0.00         0.00           Construction:         0.00         0.00           Ad.41         60.8												
Aircraft Operations         500.57         353.51           Total Aircraft         500.57         353.51           Other Mobile Sources.         5.13         26.43           GSE         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88											:	
Total Aircraft         500.57         353.51           Other Mobile Sources:         5.13         26.43           GSE         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Boilers:         1.13         32.32           Proposition Test Cells         3.26         19.89           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	3.55 23.55	223.43	266.02	245.78	576.44	14.64	180.81	246.16	300.80	570.15	16.67	225.18
Other Mobile Sources:         5.13         26.43           GSE         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           Price Station         0.66         0.00           Painting         19.35         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	3.55 23.55	223.43	266.02	245.78	576.44	14.64	180.81	246.16	300.80	570.15	16.67	225.18
GSE         5.13         26.43           Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           JP-5 Fuel Handling         0.66         0.00           Painting         19.35         0.00           Construction:         0.00         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88												
Maintenance Run-ups         71.97         165.99           Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Generators         0.71         8.67           Progine Test Cells         3.26         19.89           Service Station         19.35         0.00           Painting         19.35         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	17.1	2.00	3.09	27.35	17.03	1.84	2.24	4.57	34.01	18.73	2.20	2.66
Generators         0.56         6.89           Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Ingine Test Cells         3.26         19.89           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	90 5.65	46.27	30.13	131.19	65.36	3.91	48.77	31.59	197.60	85.86	5.51	66.41
Total Other Mobile         77.65         199.30           Stationary Sources:         1.13         32.32           Boilers:         1.13         32.32           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           JP-5 Fuel Handling         0.66         0.00           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88	8 0.45	0.48	0.56	6.89	1.48	0.45	0.48	0.56	689	1.48	0.45	0.48
Stationary Sources:         1,13         32,32           Boilers:         1,13         32,32           Generators         0,71         8,67           Engine Test Cells         3,26         19,89           JP-5 Fuel Handling         0,66         0,00           Service Station         19,35         0,00           Painting         19,30         0,00           Construction:         0,00         0,00           Total Stationary         44,41         60,88	.03 7.81	48.75	33.78	165.43	83.87	6.20	51.50	36.72	238.49	106.07	8.17	95.69
Boilers:         1.13         32.32           Generators         0.71         8.67           Engine Test Cells         3.26         19.89           JP-5 Fuel Handling         0.66         0.00           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88												
Generators       0.71       8.67         Engine Test Cells       3.26       19.89         JP-5 Fuel Handling       0.66       0.00         Service Station       19.35       0.00         Painting       19.30       0.00         Construction:       0.00       0.00         Total Stationary       44.41       60.88	1 22.09	3.84	0.78	29.13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	3.63
Generators         0.71         8.67           Engine Test Cells         3.26         19.89           JP-5 Fuel Handling         0.66         0.00           Service Station         19.35         0.00           Painting         19.30         0.00           Construction:         0.00         0.00           Total Stationary         44.41         60.88												
Engine Test Cells       3.26       19.89         JP-5 Fuel Handling       0.66       0.00         Service Station       19.35       0.00         Painting       19.30       0.00         Construction:       0.00       0.00         Total Stationary       44.41       60.88	7 0.57	0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3.77	2.21
Engine Test Cells       3:26       19:89         JP-5 Fuel Handling       0.66       0.00         Service Station       19:35       0.00         Painting       19:30       0.00         Construction:       0:00       0.00         Total Stationary       44.41       60:88												
n 19:35 0:00 19:30 0:00 0:00 0:00 0:00 0:00 0:00 0:00	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	3.71
n 19.35 0.00 19.35 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0												
n 19.35 0.00 19.30 0.00 0.00 0.00	0.00	0.00	0.46	0.00	0.00	0.00	00.0	0.54	0.00	0.00	0.00	0.00
n 19.35 0.00 19.30 0.00 0.00 0.00												
19.30 0:00 0:00 0:00 ary 44.41 60.88	0.00	0.00	4.46	0.00	0.00	0.00	0.00	4.67	00.0	0.00	0.00	0.00
0.00 0.00 ary 44.41 60.88												
0:00 0:00 ary 44.41 60.88	00.00	0.00	13.29	0.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00
0.00 0.00 ary 44.41 60.88												
ary 44.41 60.88	00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.0
44.41 60.88										:	:	
	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
Total NASO 622.64 613.70 1,260.78	.78 54.97	278.91	322.45	471.14	699.76	46.18	239.33	308.73	626.29	730.89	53.62	304.29
NALF Fentress:												
Aircraft 13.48 146.63 37.00	00 6.81	30.87	7.25	147.41	19.39	6.14	39.01	7.73	175.88	19.05	6.88	47.82
Total Annual: 636.12 760.33 1,297.79	.79 61.78	309.78	329.70 618.55	618.55	719.15	52.31	278.34	316,46	316,46 802.17	749.94	60.51	352.11

		EMISSI	MOS SNO	MARY -	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 4	ANA AND	NALF FE	NTRESS -	ARS 4	
		-								-
				Ğ.	FOR 1993 AND 1996-1999	ID 1996-19	66			
			1998		(tons per year)	r year)		1000		
Source Type	VOCs	NOX	00	SO2	PM10	VOCs	NOX	00	802	PM10
NAS Oceana:										
Mobile Sources:										
Aircraft Operations	353.57	391.86	897.18	19.68	278.39	458.04	459.72	1,176.85	22.60	322.24
Total Aircraft	353.57	391.86	897.18	19.68	278.39	458.04	459.72	1,176.85	22.60	322.24
Other Mobile Sources:										
GSE	3.67	34.57	17.17	2.32	2.79	3.69	34.66	17.22	1.73	1.92
Maintenance Run-ups	34.87	189.02	100.83	3.62	60.81	34.87	189,02	100.83	4.99	60.81
Generators	95'0	6.89	1.48	0.45	0.48	0.56	68.9	1.48	0.45	0.48
Total Other Mobile	39.11	230.48	119.48	6.39	64.08	39.12	230.56	119.53	7.18	63.21
Stationary Sources:										
Boilers:	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	02.6	54.02	67.01	1.81	9.72	9.70	54.02	67.01	1.81	9.72
				i					:	
JP-5 Fuel Handling	0.81	0.00	0.00	0.00	00.0	0.90	0.00	0.00	0.00	0.00
									-	
Service Station	6.40	0.00	0.00	0.00	0.00	6.72	0000	0.00	0.00	0.00
Painting	34.12	0.00	0.00	0.00	0.00	41.00	0.00	0.00	0.00	0.00
				1					:	:
Construction:	0.00	0.00	0.00	0.00	0.00	1:96	19.50	6.33	1.85	3.55
Total Stationary	53.76	109.02	80.96	28.40	15.31	63.01	128.52	87.29	30.25	18.86
Total NASO	446,43	731.35	1,097.61	54.47	357.78	560.16	818.80	1,383.67	60.03	404.30
NALF Fentress:										-
Aircraft	7.95	209.19	21.75	7.83	60.09	8.71	232.01	24.75	8.57	70.01
Total Annual:	454.38	940.54	1,119.37	62.30	417.88	568.87	568.87 1,050.81 1,408.42	1,408.42	68.60	474.31

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

SO2 = suffur dioxide. Key: VOC = volatile organic compounds. NOx = oxides of nitrogen.

CO = carbon monoxide.

JP-5 = jet fuel.PM10 = particulate matter.

GSE = Ground Support Equipment

(tons per year)  Year VOCs NOX CO SO2  NAS Oceana:					
Year NAS Oceana:		(tons per year)			•
NAS Oceana:	VOCS	NOx	00	802	PM10
1993	622.64	613.70	1260.78	54.97	278.91
1996	322.45	471.14	92.669	46.18	239.33
1997	308.73	626.29	730.89	53.62	304.29
1998	446.43	731.35	1097.61	54.47	357.78
1999	560.16	818.80	1383.67	60.03	404.30
Net Change:					
1993 to 1999	-62.48	205.10	122.89	5.06	125.39
NALF Fentress:					
1993	13.48	146.63	37.00	6.81	30.87
1996	7.25	147.41	19.39	6.14	39.01
1997	7.73	175.88	19.05	88.9	47.82
8661	7.95	209.19	21.75	7.83	60.09
6661	8.71	232.01	24.75	8.57	70.01
Net Change:					
1993 to 1999	-4.77	85.37	-12.25	1.77	39.14
Net Change NAS Oceana and NALF Fentress:					
1993 to 1999	-67.25	290.47	110.63	6.82	164.53

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key;

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

Table F-46
ARS 5
TOTAL AIRCRAFT OPERATIONS AT NAS OCEANA AND NALF FENTRESS
FOR 1993 AND 1996-1999

Aircraft Type	Operation type	1993	1996	1997	1998	1999
F-14A	Full LTO	12,465	9,621	9,828	6,908	6,908
	Touch&Go NASO	15,236	12,331	12,596	10,125	10,125
	GCA Box	2,178	1,048	1,071	1,022	1,022
	Interfacility	2,164	1,768	1,806	1,270	1,270
	Touch&Go NALF	10,511	13,124	13,406	9,647	9,647
F-14B/D	Full LTO	8,551	6,913	10,319	11,042	11,042
	Touch&Go NASO	10,452	7,979	11,910	12,713	12,713
	GCA Box	1,494	586	875	906	906
	Interfacility	1,485	1,269	1,894	2,007	2,007
	Touch&Go NALF	7,226	9,281	13,854	14,668	14,668
A-6	Full LTO	13,401	2,182	0	0	0
	Touch&Go NASO	16,380	2,666	0	0	0
	GCA Box	2,341	381	0	0	0
	Interfacility	2,326	379	0	0	0
	Touch&Go NALF	11,086	1,805	0	0	0
F/A-18	Full LTO	0	1,803	1,803	12,623	19,836
	Touch&Go NASO	0	2,874	2,874	20,118	31,614
	GCA Box	0	0	0	613	964
	Interfacility	0	0	0	1,788	2,809
	Touch&Go NALF	0	0	0	13,285	20,876
A-4	Full LTO	4,169	0	0	0	0
	Touch&Go	5,096	0	0	0	0
F-16	Full LTO	936	0	0	0	0
	Touch&Go	1,144	0	0	0	0
F-5	Full LTO	808	0	0	0	0
	Touch&Go	988	0	0	0	0
TC-4C	Full LTO	638	0	0	0	0
	Touch&Go	780	0	0	0	0
UH-3H	Full LTO	662	0	0	0	0
C-12	Full LTO	261	1,664	1,664	1,664	1,664
	Touch&Go	445	2,767	2,767	2,767	2,767
	GCA Box	0	1,107	1,107	1,107	1,107
S-3	Full LTO	1,741	967	967	967	967
	Touch&Go	1,295	931	931	931	931
	GCA Box	1,323	373	373	373	373
T-2C	Full LTO	1,418	0	0	0	0
T-34	Full LTO	1,040	1,040	1,040	1,040	1,040
E-2/C-2	Full LTO NALF	1,074	0	0	0	0
	Touch&Go NALF	25,058	21,374	21,374	21,374	21,374
Total		166,172	106,232	112,459	148,958	176,630

### Notes:

- (1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual F-14 aircraft population mix at Oceana.
- (2) 1993 Full LTO and Touch and Go NASO operations proportioned from NAS Oceana operations data.
- (3) GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at NAS Oceana. 1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.
- (4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).
- (5) A-6 aircraft assumed decommissioned by 1997.
- (6) 1999 and Transient aircraft operations derived from NASMOD analysis (ATAC 1997).
- (7) GCA box and interfacility flights include only the level portion of those operations.

  Takeoff and landings for these operations are accounted for under full LTO or T&G.

Key:

LTO = Landing and takeoff cycle

GCA = Ground Control Approach

NASO = Naval Air Station Oceana

NALF = Naval Auxiliary Landing Field

													*	
Aircraft (Engine Model)	(F) Mode	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor (lib /1000 lb fuell/eng)	nctor rel]/eng)			Moda	Modal Emission Rates (lb/mode)	lates	
					(I) 20A	NOx	00	203	PM10 (2)	(1)	NOI	_ 00	S02	PM10 (2)
F-14A		7.0	15.33		31.42	3.22	35.51	0.54	8.96	6.74	69.0	T 91	0.12	1.92
(TF30-P-412A)	Hot	16.0	15.33	2	31.42	3.22	55.51	0.54	8.96	15.41	1.58	27.23	0.26	4.40
	Take Off	0.4	796.67	2	0.20	4.79	10.77	0.54	00.0	0.13	3.05	98.9	0.34	0.00
	Climbout	0.4	117.50	2	0.77	09'61	1.38	0.54	2.98	0.07	1.84	0.13	0.05	0.28
	Approach	1.3	71.67	2	1.48	10.74	3.43	0.54	7.98	0.28	2.00	0.64	0.10	1.49
	Taxi In/Idle	5.3	15.33	2	31.42	3.22	55.51	0.54	8.96	5.11	0.52	9.02	0.09	1.46
	T&G Level	1.4	71.67	2	1.48	10.74	3.43	0.54	7.98	0.30	2.16	69'0	0.11	1.60
	GCA Box	9.7	71.67	2	1,48	10.74	3.43	0.54	7.98	2.06	14.93	4.77	0.75	11.10
	Interfacility	1.6	71.67	2	1.48	10.74	3.43	0.54	7.98	0,34	2.46	0.79	0.12	1.83
	Check Idle	25.0	15.33	2	31.42	3.22	55.51	0.54	8.96	24.08	2.47	42.55	0.41	6.87
									Touch and Go	9.65	6.00	1.46	0.26	3.37
									Full LTO w/hot ref.	27.74	69'6	55.80	0.96	9.54
									Full LTO w/o hot ref.	36.41	10.58	71.12	1.11	12.01
									Interfacility	0.34	2.46	0.79	0.12	1.83
								1	GCA Box	2.06	14.93	4.77	0.75	11.10
			,											T
F-14B/D		7.0	19.52	2	3.65	2.77	16.60	0.54	12.38	1:00	0.76	4.54	0.15	3.38
(F110-GE-400)	Hot	16.0	19.52	2	3.65	2.77	16.60	0.54	12.38	2.28	1.73	10.37	0.34	7.73
	Take Off	9.4	195.32	2	0+0	28.63	0.84	0.54	2.81	90'0	447	0.13	0.08	0.44
	Climbout	9.4	195.32	2	0.40	28.63	0.84	0.54	2.81	90.0	447	0.13	0.08	0.44
	Approach	1.3	133.03	2	0.26	19.61	0.76	0.54	6.10	60'0	6.78	0.26	0.19	2.11
	Taxi In/Idle	5.3	19.52	2	3.65	2.77	16.60	0.54	12.38	0.76	0.57	3.43	0.11	2.56
	T&G Level	4.	64.10	7	0.95	× 8.75	1.64	0.54	6.10	0.17	1.57	0.29	0.10	1.09
	GCA Box	9.7	64.10	7	0.95	8.75	1.64	0.54	6.10	ं 81'।	10.88	2.04	0.67	7.59
	Interfacility	1.6	64.10	7	0.95	8.75	<u>164</u>	0.54	6.10	0.19	1.79	0.34	0.11	1.25
	Check Idle	25.0	19.52	2	3.65	2.77	16.60	0.54	12.38	3.56	2.70	16.20	0.53	12.08
						SE 1828 8	1		Touch and Go	0.32	12.83	0.69	0.37	3.64
				:			1	!	Full LTO w/ hot ref.	4.25	18.79	18.87	0.95	16.67
								:	Full LTO w/o hot ref.	5.53	19.76	24.70	1.14	21.02
									Intertaciony	6.19	1.72	6.34	1:0	57.1
									CCA Box	61.1	10.30	7.04	0.67	7.59
A-6	Taxi Out/Idle	7.0	11.33	2	42.20	1.79	63.78	0.54	00.0	699	0.28	10 12	0 0	000
(J-52-P-8B)	Hot Refueling Idle	20.0	11.33	2	42.20	1.79	63.78	0.54	0.00	19.13	0.81	28.91	0.24	0.00
	Take Off	0.4	122.83	2	0.93	13.05	0.71	0.54	00.00	60'0	1.28	0.07	0.05	0.00
	Climbout	0.4	72.00	2	0.58	10.10	3.00	0.54	00.00	0.03	0.58	0.17	0.03	0.00
	Approach	1.3	38.33	2	1.72	6.34	10.54	0.54	00.00	0.17	0.63	1.05	0.05	0.00
	Taxi In/Idle	5.3	11.33	2	42.20	1.79	63.78	0.54	0.00	5.07	0.21	7.66	0.06	0.00
	T&G Level	1.4	38.33	2	1.22	6.34	10.54	0.54	00.0	0.18	0.68	1.13	90.0	0.00
	GCA Box	9.7	38.33	2	1.72	6.34	10.54	0.54	00:00	1.28	4.71	7.84	0.40	0.00
	Interfacility	1.6	38.33	2	1.72	6.34	10.54	0.54	0.00	0.21	0.78	1.29	0.07	0.00
	Check Idle	18.0	11.33	2	42.20	1.79	63.78	0.54	0.00	217.21	6.73	76.01	0.22	0.00
									Touch and Go	039	68'1	2.35	0.14	0.00
									Full LTO w/ hot ref.	31.18	3.81	47.97	0.53	0.0
				_	S C - 375 J - 7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	Sec. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10				1	the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa			-
									Full LTO w/o hot ref.	29.27	372	45.08	0.51	0.00

Aircraft												Modal Emission Rates		
(Engine Model)	Mode	Time in Mode	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor (Ib /1000 lb fuell/eng)	ctor 11/eng)			Modai )	(lb/mode)	tes	
(man)			ì		(1)	NOS	00	802	PM10 (2)	NOC(II)	NOX	00		PM10 (2)
Α-4	Taxi Out/Idle	6.5	11.33		42.20	1.79	63.78	0.54	0.00	3.11	0.13	4.70		00.0
(J-52-P-8B)	Take Off	0.4	122.83	-	0.93	13.05	0.71	0.54	0.00	0.05	0.64	0.03	0.03	0.00
	Climbout	4.0	72.00	-	85.0	10.10	3.00	0.54	0.00	0.02	0.29	0.09	0.02	0.00
	Approach	1.3	38.33	_	1.72	6.34	10.54	0.54	0.00	0.09	0.32	0.53	0.03	0.00
	Taxi In/Idle	6.5	11.33	-  -	42.20	1.79	63.78	0.54	00.0	3.11	0.13	4.70	0.04	0.00
	T&G Level	1.4	38.33		1.72	6.34	10.54	0.54	00.0	60'0	0.34	0.57	0.03	0.00
	Check Idle	18.0	11.33	<u>-</u>	42.20	1.79	63.78	0.54	00'0	8.61	0.37	13.01	0.11	0.00
									Touch and Go	1377	0.95	1.18	0.07	0.00
									Full LTO w/o hot ref.	14.97	1,88	23.05	0.26	0.00
			ļ										1	
F-16	Taxi Out/Idle	6.5	17.67	-	2.26	3.96	19.34	0.54	60.0	0.26	0.45	2.22	90.0	0.01
(F100-PW-100)	Take Off	0.4	736.67	-	0.10	16.50	55.10	0.54	00.00	0,03	4.86	16.24	91.0	0.00
	Climbout	0.4	173.33	_	0.05	44.00	1.80	0.54	0.83	00.0	3.05	0.12	0.04	90.0
	Approach	13	50.00	-	090	11.00	3.00	0.54	0.33	0.04	0.72	0.20	0.04	10.0
	Taxi In/Idle	6.5	17.67		2.26	3.96	19.34	0.54	60.0	.0.26	0.45	2.22	90.0	0.01
	T&G I evel	14	20.00		09.0	11.00	3.00	0.54	0.33	0.04	0.77	0.21	0.04	0.02
					The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon				Touch and Go	0.08	4.54	0.53	0.11	0.00
									Full LTO w/o hot ref.	0.59	9.54	21.00	0.36	0.088
										9				
F-5	Taxi Out/Idle	6.5	6.67	2	24.25	1.25	159.00	0.54	00'0	2.10	11:0	13.79	0.05	00.0
(185-GE-21)	Take Off	0.4	177.50	2	0.10	5.60	36.40	0.54	00:00	10'0	08.0	5.17	80.0	0.00
	Climbout	0.4	53.33	2	0.25	5.00	21.56	0.54	00.0	10'0	0.21	0.92	0.02	00.0
	Approach	13	20.00	2	2.58	2.92	46.25	0.54	0.00	0.13	0.15	2.41	0.03	0.00
	Taxi In/Idle	6.5	6.67	2	24.45	1.25	159.00	0.54	00.00	2.12	0,11	13.79	0.05	0.00
	T&G Level	1.4	20.00	2	2.58	2.92	46.25	0.54	00.00	0.14	0.16	2.59	0.03	0.00
		:							Touch and Go	29	0.53	5.91	0.08	0.00
	:								Full LTO w/o hot ref.	4.38	. 1.38	36.07	0.22	9.0°
							1		11			- 30 30 40 40 40 40 40 40 40 40 40 40 40 40 40		:0
F/A-18	Taxi Out/Idle		10.40	2	58.18	1.16	137.34	0.40	12.38	8.47	0.17	70.00	90.0	08.1
(F404-GE-400)	Hot Refueling Idle		10.40	7	58.18	1.16	137.34	0.40	12.38	13.31	17.0	31.42	60.0	6.00
	Take Off	0.4	475.28	7 :		3.72	23.12	04.0	0,00	7000	00.5		2	0.00
	Climbout	0.4	143.12	7 (	100	01.62	0.10	9.70	7.01	7 20 0	591	7	0.07	90
	Approach		10.70	7 (	01 83 1 83	1.16	137 34	0.40	15 38	6.41	0.13	15.14	0.04	1.36
	Te.C. I and	5.1	04:01		PP 0	8 17	1.78	0.40	6.10	0.09		0.36	0.08	1.24
	GCA Box	0.0	00 09	2	440	8.37	1.78	0.40	6.10	0.48	9,04	1.92	0.43	6.59
	Interfacility	4.1	85.00	2	0.38	11.78	1.16	0.40	6.10	60.0	2,80	0.28	0.10	1.45
	Check Idle	12.0	10.40	2	58.18	1.16	137.34	0.40	12.38	14.52	0.29	34.28	0.10	3.09
	APU	2.5	3.28	-	0.25	6.25	2.00	0.40	0.22	000	50'0	0.02	0.00	0.00
									Touch and Go	0.20	6,04	0.79	0.20	2.62
									Full LTO w/ hot ref.	28.36	8.39	75.74	0.46	7.38
									Full LTO w/o hot ref.	77.000	8.46	78.62	0.47	7.64
									Interfacility	60'0	2.80	0.28	0.10	1.45
					-				GCA Box	0.48	9.04	1.92	0.43	6.59

Aircraft				;	MODAL EMISSION NATES FOR AIRCRAFT AT NAS OCEANA				1					-
(Engine Model)	Mode	Time in Mode (minutes)	Fuel Flow ((lb/min)/eng)	Engines			Emission Factor [1b /1000 lb fuel]/eng)	actor uel]/eng)			Moda	Modal Emission Rates (Ib/mode)	ates	
					VOC(I)	NOS	83	805	PM10 (2)	V0C(I)	XON	00	802	PM10 (2)
S-3	Taxi Out/Idle	6.3	7.63	2	14,99	69'1	86:06	0.54	3.26	1.49	71.0	9.02	0.05	0.32
(TF34-GE-400)	(TF34-GE-400) Hot Refueling Idle	8.0	7.63	2	14.99	69:1	86:06	0.54	3.26	1.83	0.21	11.11	0.07	0.40
	Take Off	0.4	63.33	2	0.39	7.51	5.95	0.54	2.11	0.02	0.38	0.30	0.03	0.11
	Climbout	0.4	19.1	2	2.63	3,42	33.57	0.54	6.85	0.02	0.02	0.21	0.00	0.04
	Approach	1.3	79.7	2	2.63	3,42	33.57	0.54	6.85	50'0	0.07	19.0	0.01	0.14
	Taxi In/Idle	6.5	7.63	2	14.99	69:1	86.06	0.54	3.26	1:49	0.17	9.02	0.05	0.32
	T&G Level	8:1	79.7	2	2.63	3.42	33.57	0.54	6.85	0.07	60'0	0.93	0.01	0.19
	GCA Box	7.5	79'L	2	2.63	3.42	33.57	0.54	6.85	0:30	0.39	3.86	90.0	0.79
									Touch and Go	0.14	0.18	1.80	0.03	0.37
									Full LTO w/ hot ref.		101	30.33	0.21	1.33
								-	Full LTO w/o hot ref.		0.80	19.23	0.15	0.93
									GCA Box	0.30	0.39	3.86	0.06	0.79
												1		
C-12/TC-4	Taxi Out/Idle	19.0	2.45	2	101.63	1.97	115.31	0.54	00.00	9,46	0.18	10.74	0.05	0.00
(PT6A-41)	Take Off	0.5	8.50	2	1,75	7.98	5.10	0.54	0.00	0.01	0.07	0.04	00.0	0.00
	Climbout	2.1	7.88	2	2.03	7.57	6.49	0.54	0.00	0.07	0.25	0.21	0.02	0.00
	Approach	3.7	4.55	2	22.71	4.65	34.80	0.54	0.00	0.76	0.16	1.17	0.02	0.00
	Taxi In/Idle	7.0	2.45	2	101.63	1.97	115.31	0.54	0.00	3.49	0.07	3.96	0.02	0.00
	T&G Level	2.0	4.55	2	22.71	4.65	34.80	0.54	0.00	0.41	80.0	0.63	0.01	0.00
	GCA Box	7.5	4.55	2	22.71	4.65	34.80	0.54	00:00	1.55	0.32	2.38	0.04	00.0
									Touch and Go	-	0.49	2.02	0.05	0.00
									Full LTO w/o hot ref.		0.73	16.12	0.11	0.00
:									GCA Box	1.55	0.32	2.38	0.04	0.00
<b>UH-3</b> H	Taxi Out/Idle	0.0	. 2.20	2	130.42	1.43	178.44	0.54	0.00	4.59	0.05	6.28	0.02	0.00
(T58-GE-8F)	Take Off	0.0	13.10	2	0,40	5.47	9.03	0.54	00.0	00.0	0.00	0.00	0.00	00.0
	Climbout	5.7	10.45	2	08.0	4.68	14.13	0.54	0.00	0.10	80.0	0.11	0.03	0.00
	Approach	5.7	89.6	2	1.12	4.47	17.28	0.54	0.00	0.13	0.53	2.06	90.0	0.00
	Taxi In/Idle	7.0	2.20	2	130.42	1.43	178.44	0.54	0.00	4.02	0.04	5.50	0.02	00.0
									Full LTO w/o hot ref.	8.84	0.71	13.94	0.13	0.00
T-34	Taxi Out/Idle	6.5	1.92	_	50.17	2.43	64.00	0.54	00:00	0.63	0.03	08.0	0.01	0.00
(PT6A-25)	Take Off	0.4	7.08	_	00.0	7.81	1.01	0.54	0.00	0.00	0.02	00.0	00.0	0.00
	Climbout	0.4	29.9	-	0.00	7.00	1.20	0.54	00.00	0.00	0.02	0.00	0.00	00.0
	Approach	1.3	3.58	-	2.19	8.37	23.02	0.54	00'0	100	5004	0.11	0.00	00'0
	Taxi In/Idle	6.5	1.92	-	50.17	2,43	64.00	0.54	0.00	0.63	0.03	08.0	10.0	0.00
					1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				Full LTO w/o hot ref.		0.14	1.71	0.02	00.0

## Table F-47 ARS 5 MODAL EMISSION RATES FOR AIRCRAFT AT NAS OCEANA

Aircraft	Mode	Time in Mode	Fuel Flow	Engines			<b>Emission Factor</b>	ctor			Modal	Modal Emission Rates	ates	
(Engine Model)		(minutes)	((lb/min)/eng)			=	[lp /1000 lb fuel]/eng)	el]/eng)			J	(lb/mode)		
			•		VOC (II)	NOX	9	S02	PM10 (2)	(II) JOA	NOX	00	<b>S02</b>	PM10 (2)
F-2	Taxi Out/Idle	6.5	9.33	2	11.86	3.68	- 98'111	0.54	0.00	1.44	55'0	13.57	0.07	0.00
(J85-GE-2)	Take Off	0.4	48.17	2	0.45	6.40	21.56	0.54	0.00	0.02	0.25	0.83	0.02	0.00
	Climbout	0.4	35.92	2	99.0	5.67	28.38	0.54	00:00	0.02	0.16	0.82	0.02	0.00
	Approach	1.3	17.42	2	2.40	4.02	63.53	0.54	00:0	0.11	81.0	2.88	0.02	00.0
	Taxi In/Idle	6.5	9.33	2	11.86	3.68	111.86	0.54	00:0	1.4	0.45	13.57	0.07	00.0
									Full LTO w/o hot ref		1.48	31.66	0.19	0.00
														!
E-2/C-2	Taxi Out/Idle	19.0	86.6	2	19.24	3.53	30.11	0.54	00:0	7.30	1.34	11.42	0.20	0.00
(T56-A-16)	Take Off	0.5	36.98	2	0.14	10.45	9.65	0.54	00:00	0.01	0.39	0.02	0.02	0.00
	Climbout	2.1	36.98	2	₽1.0	10.45	9.65	0.54	00:00	0.02	1.62	0.10	0.08	0.00
	Approach	3.7	33.27	2	0.17	9.93	0.42	0.54	0.00	0.04	2.44	0.10	0.13	0.00
_	Taxi In/Idle	7.0	86.6	2	19.24	3.53	30.11	0.54	0000	2.69	0,49	4.21	0.08	0.00
_	T&G Level	1.6	15.00	2	0.95	6.52	4.54	0.54	00:0	0.05	0.31	0.22	0.03	0.00
_			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s						Touch and Go	0.11	4.38	0.42	0.24	0.00
									Full LTO w/o hot ref	. 10.05	6.29	15.85	0.52	0.00

:: Soles: F-97

(1) Aircraft VOC reported as HC in the form CHy/x

(2) Emission factors equal to 0.00 for PM10 indicate that no factor has been determined (AESO 1996).

(3) Emission factors from AESO Report Number 6-90 and USEPA AP-42.

(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Modal emission rates calculated from data provided by AESO.

(6) T&G, GCA Box and Interfacility level flight TIMs based on flight track profile speeds and distance for F-14, E-2/C-2, F/A-18 and S-3 aircraft. Level TIMs for C-12s and TC-4s were assumed to be the same as E-2/C-2 All other aircraft are assumed to have the same level TIMs as F-14s.

(7) Modal emission rates for T&G operations include approach, climbout, and T&G level modes only.

(8) Modal emission rate for full LTO w/o hot refueling includes APU use (F/A-18 only) and check idle mode.

(9) Modal emission rate for full LTO w/hot refueling does not include APU use (F/A-18 only) or check idle mode.

(10) GCA box and interfacility mode emission rates are presented only for aircraft that conduct low-altitude operations between NAS Oceana and NALF Fentress.

(11) F-14B and F-14D have the same engine types, and therefore, have identical emission rates.

(12) TC-4s are assumed to have the same emission rates as C-12s.

(13) FCLP mode is included in T&G since flight modes are similar.

Key:

VOC = volatile organic compounds LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle NOx = oxides of nitrogen LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle CO = carbon monoxide T&G = touch and go

SO2 = sulfur dioxide GCA = ground control approach
PM10 = particulate matter Interfacility = low altitude operati

Interfacility = low altitude operations between NAS Oceana and NALF Fentress

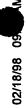
AESO = Aircraft Environmental Support Office

TIM = time in mode

						1111 111 111 11 11 11 11 11 11 11 11 11	****						
	Type of	Operation	Number of		$\omega_{z}$	N	5		Ö	S	S02	ā	PMIO
	Aircraft		Operations/Year per opera	per operation	- Total	per operation		per operation		per operation	_	per operation	
1001		F 1 1777 7 C. 2 7		í í	(111)	a)	(urv)	(qp)	(TPY)	<b>(B)</b>	(TPY)	( <b>p</b> )	(TPY)
	L-14A	rull LIO W/ not ret.	3,110	47.77	43.22	9.69	15.10	55.80	86.94	96.0	1.50	9.54	14.87
		Full L1O W/o hot ref.	9,349	36.41	170.19	10.58	49.45	71.12	332.43	E	5.20	12.01	56.16
		Touch&Go	15,236	0.65	4.91	00'9	45.70	1.46	11.10	0.26	1.98	3.37	25.66
		GCA Box	2,178	2.06	2.24	14.93	1626	4.77	5.19	0.75	0.82	11.10	12.08
		Interfacility	2,164	0.34	0.37	2.46	2.67	0.79	0.85	0.12	0.13	1.83	86.1
											-		
	F-14B	Full LTO w/ hot ref.	2,138	425	4,54	18.79	20.09	18.87	20.17	0.95	1.02	16.67	17.81
		Full LTO w/o hot ref.	6,414	5.53	17.73	97.61	63.38	24.70	79.20	1.14	3.66	21.02	67.39
		Touch&Go	10,452	0.32	69'1	12.83	67.03	69.0	3.60	0.37	1 92	3.64	19.04
		GCA Box	1,494	1.18	88'0	10.88	8.13	2.04	1.52	19:0	0.50	7.39	5.67
		Interfacility	1,485	610	0.14	1.79	1.33	0.34	0.25	0.11	0.08	1.25	0.93
												-	
	A-6	Full LTO w/ hot ref.	3,350	31.18	52.24	3.81	6.38	47.97	80.37	0.53	0.89	00.00	000
		Full LTO w/o hot ref.	10,051	29.27	147,10	3.72	18.72	45.08	226.57	0.51	2.56	00.00	00.00
		Touch&Go	16,380	0.39	3.19	1,89	15.51	2.35	19.28	0.14	1.17	000	000
		GCA Box	2,341	1.28	1.50	4.71	5.52	7.84	9.17	0.40	0.47	00.00	00.0
		Interfacility	2,326	0.21	0.25	0.78	06'0	1.29	1.50	0.07	0.08	000	00.0
	A-4	Full LTO w/o hot ref.	4,169	14.97	31.21	1.88	3.91	23.05	48.05	0.26	0.54	00.0	00.0
		Touch&Go	5,096	61.0	0.50	56.0	2.41	1.18	3.00	0.07	0.18	00:00	0.00
	P												
	F-16	Full LTO w/o hot ref.	936	0.59	0.28	9.54	4.46	21.00	9.83	0.36	0.17	0.09	0.04
	:	Touch&Go	1,144	0.08	0.05	4.54	2.59	0.53	0.30	0.11	0.06	60.0	0.05
	L L	Eull I TO m/o hot ref	000	1 30	•		, <b>, , ,</b>	ir K	i i	in te	: :	: .	
		T. T. T. T. S. C.	000	7.00	7,7	1.30	00	30.07	14.5/	0.22	0.09	0.00	0.00
		I oucheco	780	67.0	41.0	0.53	0.26	5.91	2.92	80:0	0.04	0.00	0.00
,	TC-4	Full LTO w/o hot ref.	638	13.79	4 40	0.73	0.23	16 17		0.11	0.03	i c	Q
	:	Touch&Go		1.25	0.49	0.49	0.19	2.02	0.79	0.05	0.03	00.00	00.0
	:							:			; ;	3	9
***************************************	UH-3H	Full LTO w/o hot ref.	662	8.84	2.92	0.71	0.23	13.94	4.61	0.13	0.04	00.00	0.00
	C-13	Enll I TO w/o hot ref	176	13.76	Vol	64.0	900	C I		30		. 3	-
	1	Touch B.Co.	445	20.6	00.1	6,73	60.0	21.01	2.10	1.0	0.01	00.0	00.00
		Touchiecoo	C##	1.23	0.28	0.49	11.0	2.02	0.45	0.05	0.01	00.0	0.00
	S-3	Full LTO w/ hot ref.	870	4.89	2.13	101	0.44	30.33	13.20	0.21	000	1,1	85.0
!		Full LTO w/o hot ref.	870	3.06	1.33	080	0.35	19.23	8 37	0.15	0.06	0.03	0.50
		Touch&Go	1,295	0.14	6000	0.18	0.12	08 1	117	0.03	0.00	0.37	0.54
1		GCA Box	1,323	0.30	0.20	0.39	0.26	3.86	2.55	90'0	0.04	0.79	25.0
			2										
<u>,                                    </u>	T-2C	Full LTO w/o hot ref.	1,418	3.02	2.14	1,48	1.05	31.66	22.45	61.0	0.14	0.00	00.0
1	ŧ	× 1	2										
<u></u>	1-34	Full LTO w/o hot ref.	1,040	1.26	990	0.14	0.07	1.71	0.89	0.02	0.01	0.00	00.0
	TOTAL		/17,111		. 2cmc .	Taracha Ma	353.51		1018.55		23.55		223.43

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Dipertition   Operation   Operation   Color   Operation   Color   Operation   Color   Operation   Color   Operation   Color   Color   Operation   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Co				₹.	VIRCRAFT FO	EMISSIONS R 1993 AND	AT NAS OCI 1996-1999	EANA					
Figure   Operations Very Fire formal   Total   Per operation   Total   Total   Per operation   Total   Total   Per operation   Total   Total   Per operation   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total   Total	Type o		Number of	SOA		Ž	Ox	<u> </u>	<u>O</u>	SI	ļ.		410
Full L10 w/b bir ref   2405   2774   343.9   909   1105   354.8   311.9   1105   354.8   311.9   1105   354.8   311.9   1105   354.8   311.9   311.0   325.8   111   4122   1201   312.8   1201   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   312.8   31	Aircrat		Operations/Year		Total	per operation	Total	per operation	<u></u>	per operation	Total	per operation	
Fill LIO who forter 7.145		_		(I)	(TPX)	<b>@</b>	(TEV)	(lb)	(TPY)	( <b>a</b> p)	(TPY)	(P)	(TPY)
Full LTO We kir ref.   7.316   3.44   313.6   0.035   3.317   711.2   2.56.8   7.111   4.02   1.201     Trough&Clo   7.24   7.24   7.26   7.24   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.25   7.	F-14A	-	2,405	27.74	33.36	69'6	11.65	55.80	67.10	96.0	1.16	9.54	_
Touch&Go   12,311   G655   338   G00   3659   146   889   0.25   150   337		Full LTO w/o hot ref.	-	36.41	131.36	10.58	38.17	71.12	256.58	1.11	4.02	12.01	7
CGCA Box   1,048   2,06   1,09   1,53   1,13   1,10   1,10   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178   1,178		Touch&Go	12,331	0.65	3.98	90.9	36.99	1.46	86.8	0.26	1.60	3.37	20.77
Full LTO w/ hoi ref   1,788   0.34   0.30   0.26   2.18   0.79   0.70   0.12   0.11   1.18   1.18   1.178   1.178   4.25   3.57   1.14   1.178   1.120   0.50   0.52   1.14   2.96   2.10   2.10   0.11   1.25   0.10   0.12   0.11   0.12   0.12   0.12   0.12   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0.13   0		GCA Box	1,048	2.06	1.08	14.93	7.83	4.77	2.50	0.75	0.39	11.10	<u>:</u>
Full LTO w/hot ref		Interfacility	1,768	0.34	0:0	2,46	2.18	0.79	0.70	0.12	0.11	1.83	
Full ITO w/o hot ref													
Full LTO w/o hoi ref   5.185   5.33   4.34   19.56   5.123   2.470   64.02   1.14   2.96   2.102     Touristico	F-14B/	+	1,728	4.25	3.67	18.79	16.24	18.87	16.30	0.95	0.82	19.91	:
Touch&Go   7979   G23   L285   S117   O656   O577   L277   S54     Initrafaction   7378   G23   L18			1	5.53	14.34	19.76	51.23	24.70	64.02	1.14	2.96	21.02	54.48
GCA Box         \$86         118         0.35         10.88         319         2.04         0.60         0.67         0.20           Interfacility         1,269         0.19         0.12         1.14         0.34         0.21         0.11         0.07           Full LTO w/ hot ref         1,356         2.927         2.35         3.72         3.05         3.58         0.51         0.01           Full LTO w/ hot ref         1,536         2.927         2.35         3.72         3.05         3.58         0.51         0.01           Full LTO w/ hot ref         1,536         2.957         2.004         0.78         0.15         1.29         0.24         0.01           Full LTO w/ hot ref         4.51         2.836         6.39         8.39         1.89         7.574         1707         0.46         0.10           Full LTO w/ hot ref         4.51         2.836         6.39         8.46         5.77         7.86.2         33.16         0.47         0.20           Full LTO w/ hot ref         4.84         4.89         1.18         1.01         0.24         0.79         1.14         0.20         0.23           Full LTO w/ hot ref         1.84         4.89         1.18		Touch&Go	<u>!</u>	0.32	1.29	12.83	31.17	69.0	2.75	0.37	1.47	3.64	:
Full LTO w/ hoi ref.   1,536   2,137   2,355   1,12   1,04   47.97   13.08   0.53   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15	-	GCA Box	586	1.18	0.35	10.88	3.19	2.04	09.0	19:0	0.20	7.59	:
Full LTO w/ hot ref.         545         31/18         8.50         3.81         T/4         47.97         13.08         0.53         0.15           Full LTO w/ hot ref.         1.546         29.27         23.35         3.81         1.04         47.97         13.08         0.53         0.15           Full LTO w/o hot ref.         2,666         0.39         0.24         47.1         0.00         7.84         1.49         0.04         0.08           Full LTO w/o hot ref.         451         2.83.6         6.39         8.39         1.89         75.74         17.07         0.46         0.10           Full LTO w/o hot ref.         1.352         2.957         2.000         8.46         5.72         33.36         0.07         0.01           Full LTO w/o hot ref.         1.352         2.957         2.000         8.46         5.72         30.33         7.33         0.07         0.01           Full LTO w/o hot ref.         1.352         2.957         0.00         0.74         0.86         0.79         1.14         0.20         0.03           Full LTO w/o hot ref.         0.34         0.30         0.07         3.86         0.75         1.14         0.20         0.01           F	!	Interfacility	1,269	0.19	0.12	1.79	1.14	0.34	0.21	0.11	0.07	1.25	
Full LTO w/hoi ref.         345         3118         8.50         3381         1 04         47.97         13.08         0.53         0.15           Full LTO w/hoi ref.         1,656         22.27         23.95         3.72         3.05         45.08         3.68         0.51         0.04           CGA Box         2,666         0.39         0.24         4.71         0.09         2.35         3.14         0.14         0.19           GCA Box         3,666         0.39         0.24         4.71         0.04         0.19         0.04           GCA Box         3,666         0.24         4.71         0.04         0.18         0.24         0.01         0.01           Full LTO w/hoir ref.         4,51         2.83.6         6.39         8.39         1.89         75.74         17.07         0.46         0.10           Full LTO w/hoir ref.         4,81         0.20         0.29         6.04         8.86         0.79         1.14         0.20         0.28           Full LTO w/hoir ref.         4,84         4.89         1.18         1.01         0.79         1.14         0.20         0.28           Full LTO w/hoir ref.         0         8,84         0.00 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>													
Full LTO w/o hot ref         1,636         29.27         23.35         3.72         3.55         45.08         36.88         0.51         0.42           Touch&Co         2,666         0.39         0.32         1.89         2.55         2.35         3.14         0.19         0.019           Incertacility         381         1.28         0.34         0.04         4.71         0.99         78.41         1.70         0.40         0.08           Full LTO w/b hot ref         451         28.36         6.39         8.39         1.89         75.74         17.07         0.46         0.01           Full LTO w/b hot ref         1,352         29.57         2.09         8.46         8.77         1.76         0.47         0.03           Full LTO w/b hot ref         4.84         4.89         1.18         1.01         0.24         0.79         1.14         0.20         0.29         0.04         0.03         0.03         0.04         0.03         0.04         0.03         0.04         0.04         0.08         0.01         0.04         0.03         0.04         0.04         0.08         0.01         0.04         0.03         0.04         0.07         0.04         0.03         0.04	9-Y	Full LTO w/ hot ref.	545	31.18	8.50	3.81	1.04	47.97	13.08	0.53	0.15	00.00	;
Touch&GG   2,666   0.39   0.52   189   2.53   2.35   3.14   0.14   0.19   0.09   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.0		Full LTO w/o hot ref.	1,636	29.27	23.95	3.72	3.05	45.08	36.88	0.51	0.42	00.00	<u>:</u>
GCA Box         381         1.28         0.24         471         0.90         784         1.49         0.40         0.08           Interfacility         377         0.21         0.04         0.78         0.15         1.29         0.24         0.07         0.01           Full LTO w/ hot ref.         451         28.36         6.39         8.39         1.89         75.74         17.07         0.46         0.10           Full LTO w/ hot ref.         1,352         29.37         20.00         8.46         5.72         78.27         0.04         0.28           Full LTO w/ hot ref.         1,352         29.37         20.00         6.04         8.68         0.79         1.14         0.20         0.28           Full LTO w/ hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.03           Full LTO w/ hot ref.         484         3.06         0.74         0.80         0.19         1.80         0.73         0.05         0.13         0.01           GCA Box         3731         0.34         0.00         0.71         0.00         1.394         0.00         0.13         0.00           Full LTO w/		Touch&Go	2,666	0.39	0.52	1.89	2.53	2.35	3.14	0.14	0.19	00.0	:
Full LTO w/s hot ref.   451   28.36   6.39   8.39   1.89   75.74   17.07   0.46   0.10     Full LTO w/s hot ref.   451   28.36   6.39   8.39   1.89   75.74   17.07   0.46   0.10     Full LTO w/s hot ref.   451   28.36   6.39   8.46   5.72   78.52   53.16   0.47   0.32     Touch&Go   5.874   0.20   0.29   6.04   8.68   0.79   1.14   0.20   0.28     Full LTO w/s hot ref.   484   4.89   1.18   1.01   0.24   30.33   7.33   0.21   0.05     Full LTO w/s hot ref.   484   3.66   0.74   0.80   0.19   19.23   4.65   0.15   0.00     Full LTO w/s hot ref.   0.88   0.00   0.71   0.00   0.19   1.80   0.84   0.00     Full LTO w/s hot ref.   1.664   1.379   1.148   0.73   0.60   16.12   13.41   0.11   0.09     Full LTO w/s hot ref.   1.664   1.379   1.148   0.73   0.60   16.12   13.41   0.11   0.09     Full LTO w/s hot ref.   1.664   1.379   1.148   0.73   0.60   16.12   13.41   0.11   0.09     Full LTO w/s hot ref.   1.664   1.35   0.66   0.39   0.68   2.02   2.79   0.05   0.05     Full LTO w/s hot ref.   1.040   1.35   0.66   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/s hot ref.   1.040   1.35   0.66   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/s hot ref.   1.040   1.35   0.66   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/s hot ref.   1.040   1.35   0.66   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/s hot ref.   1.040   1.35   0.14   0.07   1.71   0.00   0.13   0.01     Full LTO w/s hot ref.   1.040   1.35   0.14   0.00   0.14   0.00   0.14   0.00   0.14   0.00   0.01   0.01     Full LTO w/s hot ref.   1.040   1.35   0.14   0.00   0.14   0.00   0.14   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00		GCA Box	381	1.28	0.24	4.71	06.0	7.84	1.49	0.40	80.0	00.0	
Full LTO w/ hot ref.         451         28.36         6.39         8.39         1.89         75.74         1707         0.46         0.10           Full LTO w/o hot ref.         1,352         29.57         20.09         8.46         3.72         78.62         53.16         0.47         0.32           Touch&Co         2,874         0.20         0.29         6.04         8.68         0.79         1.14         0.20         0.28           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.04           Touch&Co         931         0.14         0.07         0.18         0.09         1.80         0.72         0.06         0.01           GCA Box         373         0.30         0.06         0.39         0.07         1.86         0.72         0.06         0.01           Full LTO w/o hot ref.         1,664         13.79         11.48         0.73         0.60         15.12         13.41         0.00           GCA Box         1,1		Interfacility	379	0.21	0.04	0.78	0.15	1.29	0.24	0.07	10.0	00.0	
Full LTO w/o hot ref.         451         28.36         6.39         8.39         1.89         75.74         17.07         0.46         0.10           Full LTO w/o hot ref.         1,352         29.57         20.00         8.46         57.2         78.62         53.16         0.47         0.03           Full LTO w/o hot ref.         1,352         29.57         20.00         6.04         8.68         0.79         1.14         0.20         0.28           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.03           Full LTO w/o hot ref.         373         0.14         0.09         0.19         1.80         0.84         0.03         0.01           Full LTO w/o hot ref.         1,654         13.79         11.48         0.73         0.66         1.54         0.05         0.05           Full LTO w/o hot ref.         1,07         0.35         0.32         0.36         0.11         0.00         0.11         0.00           Full LTO w/o hot ref.													
Full LTO w/o hot ref.         1,352         29.57         20.00         8.46         572         78.62         53.16         0.47         0.32           Touch&Go         2,874         0,20         0,29         6.04         8.68         0.79         1.14         0.20         0.28           Full LTO w/hot ref.         484         4.89         1.18         1.0         0.24         30.33         7.33         0.21         0.05           Full LTO w/hot ref.         484         4.89         1.18         1.0         0.24         30.33         7.33         0.21         0.05           Full LTO w/hot ref.         484         4.89         1.18         1.0         0.24         30.33         7.33         0.21         0.05           GCA Box         373         0.14         0.07         0.18         0.05         0.15         0.05         0.01           Full LTO w/o hot ref.         1,664         13.79         11.48         0.73         0.60         0.13         0.00         0.11         0.00           Full LTO w/o hot ref.         1,07         1.35         0.35         0.32         2.79         0.05         0.05           GCA Box         1,107         1.35	F/A-18	İ	451	28.36	6.39	8.39	1.89	75.74	17.07	0.46	0.10	7.38	
Full LTO w/o hoi ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hoi ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hoi ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04           Full LTO w/o hoi ref.         373         0.14         0.07         0.18         0.09         1.80         0.84         0.01           Full LTO w/o hoi ref.         0         8.84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hoi ref.         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Full LTO w/o hoi ref.         1,107         1.55         0.36         0.32         2.79         0.05         0.05           Full LTO w/o hoi ref.         1,107         1.56         0.36         0.32         2.79         0.05         0.05           Full LTO w/o hoi ref.         1,007         0.36         <	1	Full LTO w/o hot ref.	:	29.57	20.00	8.46	5.72	78.62	53.16	0.47	0.32	7.64	
Full LTO w/ hoi ref.         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hoi ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04           Touch&Go         931         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01           GCA Box         373         0.14         0.07         0.18         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hoi ref.         0         8.84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hoi ref.         1,654         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Full LTO w/o hoi ref.         1,07         1.35         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,107         1.35         0.66         0.14         0.07         1.71         0.09         0.01           Full LTO w/o hoi ref. <t< td=""><td></td><td>Touch&amp;Go</td><td>2,874</td><td>0.20</td><td>0.29</td><td>6.04</td><td>8:68</td><td>0.79</td><td>1.14</td><td>0.20</td><td>0.28</td><td>2.62</td><td></td></t<>		Touch&Go	2,874	0.20	0.29	6.04	8:68	0.79	1.14	0.20	0.28	2.62	
Full LTO w/ hot ref         484         4.89         1.18         1.01         0.24         30.33         7.33         0.21         0.05           Full LTO w/o hot ref         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04           Touch&Go         931         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01           GCA Box         373         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref         1,654         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Full LTO w/o hot ref         1,107         1.35         1.72         0.49         0.68         2.02         2.79         0.05           GCA Box         1,107         1.35         0.86         0.14         0.07         1.71         0.09           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.09         0.00	1							 	10	ie ic	;t ;c		-
Full LTO w/o hoiref         484         3.66         0.74         0.80         0.19         19.23         4.65         0.15         0.04           Touch&Go         931         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01           GCA Box         373         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hoiref         0         8.84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hoiref         1,654         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           GCA Box         1,107         1.35         1.72         0.49         0.68         2.02         2.79         0.03         0.06           Full LTO w/o hoiref         1,040         1.26         0.34         0.07         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hoiref         1,040         1.26         0.64         0.07         0.07         1.71         0.89         0.02         0.01	S-3	Full LTO w/ hot ref.	484	4.89	. 18 8	1.01	0.24	30.33	7.33	0.21	0.05	1.33	
Touch&Go         931         0.14         0.07         0.18         0.09         1 80         0.84         0.03         0.01           GCA Box         373         0.30         0.06         0.39         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hoiref.         0         8 84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hoiref.         1,64         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           CCA Box         1,107         1.35         0.86         0.32         0.18         2.79         0.03         0.06           Full LTO w/o hoi ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01		Full LTO w/o hot ref.	484	3.06	0.74	0.80	0.19	19.23	4.65	0.15	0.04	0.93	
GCA Box         373         0.30         0.06         0.07         3.86         0.72         0.06         0.01           Full LTO w/o hot ref.         0         8.84         0.00         0.71         0.00         13.94         0.00         0.13         0.00           Full LTO w/o hot ref.         1,654         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Touch&Go         2,767         1.25         1,72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,107         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01		Touch&Go	931	0.14	0.07	0.18	0.09	1.80	0.84	0.03	0.01	0.37	
Full LTO w/o hoiref.         0         8 84         0 00         071         0 00         13.94         0.00         0.13         0.00           Full LTO w/o hoi ref.         1,644         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Touch&Go         2,767         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,107         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hoi ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01		GCA Box	373	0.30	90.0	0.39	0.07	3.86	0.72	90.0	0.01	0.79	
Full LTO w/o hot ref         0         8.84         0.00         0.71         0.00         15.94         0.00         0.13         0.00           Full LTO w/o hot ref         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Touch&Go         2,767         1,25         1.72         0.49         0.68         2.02         2.79         0.05         0.06           GCA Box         1,107         1.55         0.86         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01								i i	į	ic	.0	.0	
Full LTO w/o hot ref         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09           Touch&Go         2,767         1.25         1.72         0.49         0.68         2.02         2.79         0.03         0.06           GCA Box         1,107         1.55         0.86         0.32         0.18         2.38         1.31         0.04         0.02           Full LTO w/o hot ref         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01	UH-31			8.84	80	0.71	00.0	13.94	0.00	0.13	000	000	
Touch&Co         2,767         1,25         1,72         0,49         0,68         2,02         2,79         0,05         0,06           GCA Box         1,107         1,55         0,86         0,32         0,18         2,38         1,31         0,04         0,02           Full LTO w/o hot ref.         1,040         1,26         0,66         0,14         0,07         1,71         0,89         0,02         0,01	2	1	:	13.70	11 48	0.73	0.40	1612	13 41	0 11	60.0	000	
GCA Box 1,107 1.55 0.86 0.32 0.18 1.31 0.04 0.02 [Full LTO w/o hot ref. 1,040 1.26 0.66 0.14 0.07 1.71 0.89 0.02 0.01	1	!	-	1.95	1.00	67.0	0.68	2.02	2.79	0.05	90.0	000	-
Full LTO w/o hot ref. 1,040 1,26 0,66 0,14 0,007 1.71 0.89 0.02 0.01		GCA Box	1.107	1.55	0.86	0.32	0.18	2.38	1.31	0.04	0.02	00.0	-
Full LTO w/o hot ref. 1,040 1.26 0.66 0.14 0.07 1.71 0.89 0.02 0.01													-
	T-34	Full LTO w/o hot ref.	1,040	1.26	99'0	0.14	10.07	1.71	68.0	0.02	0.01	00.00	-

						A K.S. A							
				A	IRCRAFT FOI	IRCRAFT EMISSIONS AT NAS OCEANA FOR 1993 AND 1996-1999	AT NAS OC 1996-1999	EANA					
	Type of	Operation	Number of	20A	10	Ž	<b>6</b>	0.2	Ω	802	<u>n</u>	PIA	PMI0
	Aircraft		Operations/Year per operation	per operation	Total	per operation	Total	per operation	Total	per operation	Total	-	Total
1007	F 17A	Cull 1 TO w/ hot gat	7 767	(m)	(1111)		(151)	(an)	(IFT)	(a)	(IFY)	(a)	(IPY)
1221	L-14A	ruli LIOW/ not rei.	2,437	1,77	34.08	7.03	<b>R</b> .⊟	55.80	68.55	0.96	8 - -	9.54	11.72
		Full LTO w/o hot ref.	7,371	36.41	134.18	10.58	38.99	71.12	262.10	=	4.10	12.01	44.28
	:	Touch&Go	12,596	9.65	4.06	90'9	37.78	1.46	9.18	0.26	1.64	3.37	21.21
		GCA Box	1,071	2.06	011	14.93	8.00	4.77	2.55	0.75	0.40	11.10	5.94
		Interfacility	1,806	0.34	0.31	2.46	2.22	62.0	0.71	0.12	0.11	1.83	1.65
	F-14B/D	Full LTO w/ hot ref.	2,580	4.25	5.48	18.79	24.24	18.87	24.33	0.95	1.23	16.67	21.50
		Full LTO w/o hot ref.	7,739	5.53	21.40	97.61	76.48	24.70	95.57	1.14	4.42	21.02	81.32
		Touch&Go	11,910	0.32	1.92	12.83	76.38	69:0	4.10	0.37	2.19	3.64	21.70
		GCA Box	875	81.1	0.52	10.88	4.76	2.04	0.89	19'0	0.29	7.59	3.32
		Interfacility	1,894	610	0.18	1.79	1.70	0.34	0.32	0.11	0.10	1.25	1 18
													:
	F/A-18	Full LTO w/ hot ref.	451	28.36	6.39	8.39	1.89	75.74	17.07	0.46	0.10	7.38	1.66
		Full LTO w/o hot ref.	1,352	29.5T	20.00	8.46	5.72	78.62	53.16	0.47	0.32	7.64	5.17
		Touch&Go	2,874	0.20	0.29	6.04	8.68	0.79	1.14	0.20	0.28	2.62	3.77
											: .		
	S-3	Full LTO w/ hot ref.	484	4.89	1.18	10:1	0.24	30.33	7.33	0.21	0.05	1.33	0.32
		Full LTO w/o hot ref.	484	3.06	0.74	080	0.19	19.23	4.65	0.15	0.04	0.93	0.23
	:	Touch&Go	931	0.14	0.07	0.18	60.0	1.80	0.84	0.03	0.01	0.37	0.17
	:	GCA Box	373	0.30	90.0	0.39	200	3.86	0.72	90:0	0.01	0.79	0.15
	C-12	Full LTO w/o hot ref.	1,664	13.79	11.48	0.73	09:0	16.12	13.41	0.11	60.0	00.00	0.00
		Touch&Go	2,767	1.25	1.72	0.49	89.0	2.02	2.79	0.05	0.06	0.00	0.00
	:	GCA Box	1,107	1.55	0.86	0.32	0.18	2.38	1.31	0.04	0.02	00.00	00.0
	T-34	Full LTO w/o hot ref.	1,040	1.26	99.0	0.14	0.07	17.1	0.89	0.02	0.01	00.00	0.00
	Total		63,825	** インスのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 ないのでは、 はいのでは、 はいのでは、 はいのでは、 はいでは、 はいでは、 はいでは、 はいでは、 はいでは、 はいでは、 はいでは、 はいでは、 はいでは、 は	246.67		400 88		571 63	-	07 21		775 1A



Third   Third where   Third where   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third   Third								2						
Type of   Operation   Number of   Operation   Continue of   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Operation   Oper					¥	VIRCRAFT E	ARS 5 MISSIONS ,	AT NAS OCI	EANA					
F-14A   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered   1,727   Full L1O wholered		Tope of				FOR	1993 AND 1	1996-1999		i				
Fig. 1.0		1ype of		Number of			N		٥	Ω	35	7.7	P	10
F-14A   Full LTO wholeted   1,727   17.74   14.74   15.04   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74   17.74		VIETE I		Operations/Year	per operation		per operation	Total	per operation	Total	per operation	Total	per operation	Total
Figli I TO wis bird red   3.18   2.54   4.25   5.58   4.81   5.58   6.58   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.59   6.	1999	F-14A	Full I'm w/ not ret	464.1	fort	î î	(a)	(IRV)	(Ib)	(TPY)	( <b>J</b>	(TPV)	(g)	(TPY)
CGA Box   1,131   0,544   3,124   0,545   3,124   1,127   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,131   1,			Euli TO W/ Hot let.	1,12/		67.52	9.09	8.37	55.80	48.18	96'0	0.83	9.54	8.24
Cocord Box   1022   2.06			Full LTO W/O IIGH IEL.	191,0	30.41	74.32	10.58	27.40	71.12	184.22	E	2.88	12.01	31.12
Total Roy   1,022   2,06   1,05   14,33   7,63   4,77   2,44   0,75   0,38   11,10			1 Outched GO	10,125	0.65	3.27	00'9	30.37	1.46	7.38	0.26	1.31	3.37	17.05
Full LTO w/o for ref.   1,370   0,34   0,22   2,46   1,55   0,79   0,50   0,12   0,08   1,85     Full LTO w/o for ref.   2,761   4,25   2,590   1,875   1,594   1,877   2,504   0,55   1,31   16,67     Full LTO w/o for ref.   4,939   2,835   2,590   1,75   1,88   2,34   0,34   0,37   1,14   4,73   1,107     Full LTO w/o for ref.   4,939   2,835   2,03   2,04   0,34   0,34   0,31   0,11   1,25     Full LTO w/o for ref.   4,939   2,835   2,03   3,14   2,63   0,37   0,43   0,17   1,25   0,30     Full LTO w/o for ref.   4,844   4,89   1,18   1,18   1,04   0,13   0,14   0,14   0,13   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14   0,14			GCA BOX	1,022	2.06	1.05	14.93	7,63	4.77	2.44	0.75	0.38	11.10	5.67
Full LTO whol ref.   2,761   4.23   5.86   18.79   15.94   18.87   26.04   0.95   1.31   16.67   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1.30   1			Interfacility	1,270	0.34	0.22	2.46	1.56	0.79	0.50	0.12	80.0	1.83	7.16
Full LTO who her ref.   4,70		D 140/D	E.H 1 TO / E. 1 F	22.5									1	
Touched   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach Biox   Cach B		C/971	Euli LTO W/ not ref.	2,/01	4.25	5,86	18.79	25.94	18.87	26.04	0.95	1.31	16.67	23.00
CONDITION   12,113   0.54   2.155   12.83   81.53   0.65   0.53   0.53   0.55     Interfacility   2.007   1.18   0.54   0.53   1.18   0.54   0.54   0.55   0.55   0.55     Interfacility   2.007   1.18   0.53   1.75   1.75   1.25   0.55   0.55   0.55   0.55     Full LTO w/ hot ref.   4.959   28.36   70.33   8.39   20.79   75.74   87.81   0.45   0.41   7.38     Full LTO w/ hot ref.   4.84   4.89   1.18   0.23   3.54   0.23   0.45   0.15   0.25   3.51   7.54     Full LTO w/ hot ref.   4.84   4.89   1.18   1.45   0.23   0.35   0.15   0.15   0.55     Full LTO w/ hot ref.   4.84   4.89   1.18   1.40   0.24   3.54   0.23   0.15   0.55   0.15   0.55     Full LTO w/ hot ref.   4.84   4.89   1.18   1.41   0.07   0.19   0.19   0.15   0.00   0.15     Full LTO w/ hot ref.   4.84   4.89   1.18   1.40   0.24   0.23   0.15   0.05   0.01   0.15     Full LTO w/ hot ref.   4.84   4.89   1.18   0.05   0.19   0.15   0.05   0.01   0.15      Full LTO w/ hot ref.   4.84   4.89   1.18   0.05   0.19   0.15   0.05   0.01   0.15      Full LTO w/ hot ref.   4.84   4.89   1.18   0.05   0.05   0.05   0.05   0.05      Full LTO w/ hot ref.   4.84   4.89   1.18   0.05   0.05   0.05   0.05      Full LTO w/ hot ref.   4.84   4.89   1.18   0.14   0.07   0.18   0.05   0.05   0.05      Full LTO w/ hot ref.   1.664   1.35   1.72   0.49   0.68   2.02   2.79   0.05   0.05   0.05      Full LTO w/ hot ref.   1.040   1.35   0.36   0.14   0.07   0.18   0.38   0.05   0.05   0.05      Full LTO w/ hot ref.   1.040   1.35   0.05   0.14   0.07   0.18   0.05   0.05   0.05      Full LTO w/ hot ref.   1.040   1.35   0.05   0.14   0.07   0.18   0.05   0.05   0.05   0.05      Full LTO w/ hot ref.   1.040   1.35   0.05   0.14   0.07   0.18   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0			Touch & Co	287,8	5.5	22.90	19,76	81.84	24.70	102.27	1.14	4.73	21.02	87.02
Full LTO who in ref.   1,89			1 OUGH & CO	12,/13	0.32	2.05	12.83	81.53	69'0	4.38	0.37	2.34	3.64	23.16
Full LTO w/o hot ref.   1,599   23,36			GCA BOX	906	8.	0.54	88'01	4.93	2.04	0.92	29.0	0.30	7.59	3.44
Full LTO w/ hoi ref.         4,959         28.36         70.31         8.39         20.79         75.74         187.81         0.46         11.4         7.38           Full LTO w/o hoi ref.         14,877         29.37         219.35         8.49         20.79         75.74         187.81         0.46         1.14         7.54           Touch&Go         31,614         0.20         3.19         6.04         62.34         0.79         12.22         0.20         3.11         2.62           GCA Box         964         0.48         0.23         9.04         4.36         1.92         0.93         0.43         0.21         5.52           GCA Box         964         0.58         0.13         0.28         0.19         1.92         0.93         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.13         0.14         0.13         0.14         0.03         0.01         0.13         0.05         0.01         0.05         0.00         0.01         0.05         0.01         0.05         0.00         0.01         0.05         0.00			Intertactiffy	2,007	0.19	0.20	1.79	1.80	0.34	0.34	0.11	0.П	1.25	1.26
Full LTO w/o hot ref.   4,959   28,36   70,31   8,39   20,79   75,74   187,81   0.46   1.14   7.38   7.54   18.71   1.25   0.47   3.51   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.55   7.55   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.54   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.55   7.5		81. ¥/×	× × × × × × × × × × × × × × × × × × ×											
Touch&Go   1,644   0.20		F/A-18	Full LIO w/ hot ref.	4,959	28.36	70.31	8.39	20.79	75.74	187.81	0.46	1.14	7.38	18,30
Touch&Go			ruii L.I.O W/o not ret.	14,877	29.57	219.95	8.46	62.94	78.62	584.79	0.47	3.51	7.64	56.83
Total Box   964   0.48   0.23   9.04   4.36   1.92   0.93   0.43   0.21   6.59     Interfacility   2,809   0.09   0.13   2.80   3.94   0.28   0.39   0.10   0.13   1.45     Full LTO w/hoi ref.   484   4.89   1.18   1.01   0.04   0.03   0.15   0.04   0.03     Full LTO w/o hoi ref.   484   4.89   1.18   1.01   0.05   0.15   0.04   0.03     Full LTO w/o hoi ref.   1.64   13.79   11.48   0.73   0.05   0.07   0.06   0.07   0.05     Full LTO w/o hoi ref.   1.64   13.79   11.48   0.73   0.66   1.612   1.34   0.01   0.05   0.00     Full LTO w/o hoi ref.   1.64   13.79   11.48   0.73   0.68   2.02   2.79   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.44   0.07   1.71   0.89   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.45   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   1.25   0.05   0.00     Full LTO w/o hoi ref.   1.040   0.05   0.00     Full LTO w/o hoi ref.   1.040   0.05   0.00     Full LTO w/o hoi ref.   1.040   0.05   0.00			10uchæco	31,614	0.20	3.19	6.04	95.49	0.79	12.52	0.20	3.11	2.62	41 49
Full LTO w/ hot ref.   484   489   613   2.80   3.94   6.28   6.39   6.10   6.13   1.45     Full LTO w/ hot ref.   484   4.89   1.18   1.01   6.24   30.33   7.33   6.21   6.05   1.33     Full LTO w/ hot ref.   484   4.89   1.18   1.01   6.19   6.19   6.19   6.19   6.19   6.19   6.15   6.04   6.93     Full LTO w/ hot ref.   1.664   13.79   11.48   0.73   0.66   16.12   13.41   0.11   0.05   0.05     Full LTO w/ hot ref.   1.664   13.79   11.48   0.73   0.68   2.02   2.79   0.05   0.00     Full LTO w/ hot ref.   1.644   1.25   1.72   0.49   0.68   2.02   2.79   0.05   0.00     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.05   0.00     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.05   0.00     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.05   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   1.71   0.89   0.02   0.01     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   0.07   0.01   0.00     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   0.07   0.01   0.00     Full LTO w/ hot ref.   1.040   1.26   0.56   0.14   0.07   0.07   0.01   0.00     Full LTO w/ hot ref.   1.040   0.05   0.05   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0	_		GCA Box	964	0.48	0.23	9.04	4.36	1.92	0.93	0.43	0.21	. 6.59	3.18
Full LTO w/ hoi ref.         484         4.89         1.18         T.01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hoi ref.         484         3.06         0.74         0.80         0.19         19.23         4.65         0.15         0.04         0.93           Touch&Co.         931         0.14         0.07         0.18         0.09         1.80         0.84         0.03         0.01         0.57           GCA Box         373         0.16         0.39         0.07         3.86         0.72         0.06         0.01         0.79           Full LTO w/o hot ref.         1.664         13.79         11.48         0.73         0.66         16.12         13.41         0.11         0.06         0.00           Touch&Go         2.767         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.00           GCA Box         1,107         1.35         0.86         0.32         0.18         2.39         0.05         0.00         0.00           Full LTO w/o hot ref.         1,040         1.26         0.56         0.14         0.07         1.71         0.89 <t< th=""><th></th><th></th><th>Interfacility</th><th>2,809</th><th>60.0</th><th>0.13</th><th>2.80</th><th>3.94</th><th>0.28</th><th>0.39</th><th>0.10</th><th>0.13</th><th>1.45</th><th>2.04</th></t<>			Interfacility	2,809	60.0	0.13	2.80	3.94	0.28	0.39	0.10	0.13	1.45	2.04
Full LTO w/o hot ref.         484         4.89         118         L01         0.24         30.33         7.33         0.21         0.05         1.33           Full LTO w/o hot ref.         484         3.06         0.04         0.08         0.19         19.23         4.65         0.15         0.04         0.93           GCA Box         373         0.14         0.07         0.18         0.07         1.80         0.84         0.03         0.01         0.37           Full LTO w/o hot ref.         1.674         13.79         11.48         0.73         0.66         16.12         13.41         0.11         0.09         0.00           Full LTO w/o hot ref.         1.67         1.23         1.72         0.49         0.68         2.79         0.05         0.00           GCA Box         1.107         1.35         0.86         0.32         0.18         2.39         0.02         0.00         0.00           Full LTO w/o hot ref.         1.040         1.26         0.66         0.17         0.07         0.07         0.07         0.00         0.00         0.00           Full LTO w/o hot ref.         1.040         1.26         0.66         0.17         0.07         0.07		6.3	E.H.1 40/L	107									:	
Touch&Go   1.00 wo hot ref.   1.564   13.79   1.35   0.66   0.13   0.07   0.18   0.07   0.18   0.09   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.0			E.II I TO "/ Let	404	4.8	81:1	101	0.24	30.33	7.33	0.21	0.05	1.33	0.32
GCA Box   373   0.14   0.07   0.18   0.09   1.80   0.84   0.03   0.01   0.37			Touch P.C.	484	9.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1	0.74	0.80	0.19	19.23	4.65	0.15	0.04	0.93	0.23
Full LTO w/o hot ref. 1,564 13.79 0,06 0,39, 0,07 3.86 0,72 0,06 0,01 0,79  Full LTO w/o hot ref. 1,564 13.79 1.48 0,73 0,60 16.12 13.41 0,11 0,09 0,00 0,00 0,00 0,00 0,00 0,0			TOTAL DE	100	0.14	70.0	0.18	0.09	1.80	0.84	0.03	10:0	0.37	0.17
Full LTO w/o hor ref.         1,664         13.79         11.48         0.73         0.60         16.12         13.41         0.11         0.09         0.00           Touch & Co.         2,767         1.25         1.72         0.49         0.68         2.02         2.79         0.05         0.06         0.00           GCA Box         1,107         1.35         0.86         0.32         0.18         2.38         1.31         0.04         0.00           Full LTO w/o hor ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00           Full LTO w/o hor ref.         110,065         461.02         1.71         0.89         0.02         0.01         0.00			GCA BOX	5/3	0.30	90'0	0.39	0.07	3.86	0.72	90.0	0.01	0.79	0.15
Touche Act   1,007   1,25   1,148   0,149   0,648   1,517   0,649   0,000   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649   0,649		C-12	Fill I TO w/o hot ref	1 564	1 30				N.					
CGA Box   1,107   1.25   1,172   0.48   2.02   2.79   0.05   0.00			Territory of the feet.	1,004	2.73	11.48	0.73	0.60	16.12	13.41	0.11	0.09	00.0	00.0
CLA BOX         1,10 / 1,35         0.86         0.32         0.18         2.38         1.31         0.04         0.02         0.00           Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00           110.066         464.91         461.02         1195.05         22.70         0.00			1 outring Co	7,0/	\$	1.72	0.49	0.68	2.02	2.79	0.05	90.0	0.00	0.00
Full LTO w/o hot ref.         1,040         1.26         0.66         0.14         0.07         1.71         0.89         0.02         0.01         0.00           110.065         464.91         461.02         1195.05         22.70         22.70		-	GCA B0X	/01'1	1.35	0.86	0.32	0.18	2.38	1.31	0.04	0.02	0.00	0.00
Full LLO W/O ROTTET 1,040 1.26 0.06 0.14 0.07 1.71 0.89 0.02 0.01 0.00 0.00 110,065 22.70		T 37	E.II 1 TO 1 122 1	40.1										
110,065 22.70		1-74	- 110 W/0 II0t ICI.	1,040	1.26	0.66	0.14	20'0	1.71	0.89	0.02	0.01	0.00	0.00
		I DIST		,		464.91		461.02	:	1195.05	1	22.70		171 87

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) Number of GCA and Interfacility flights for 1993 and 1996 proportioned from 1997 data based on number of aircraft at Oceana.

1997 and 1999 data from Wyle (1997). 1998 data same as 1999 due to same number of aircraft.

(3) 1993 Full LTO and Touch and Go NASO proportioned from air traffic operation records.(4) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).(5) A-6 aircraft assumed decommissioned by 1997.

(6) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997).
 (7) Aircraft VOC reported as HC in the form CHy/x
 (8) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

(9) LTOs for GCA box and interfacility flights include only the level portion of those operations. Takeoff and landings for these operations are accounted for under full LTO or T&G.

VOC = volatile organic compounds NOx = oxides of nitrogen SO2 = sulfur dioxide PM10 = particulate matter CO = carbon monoxide

Key:

interfacility = Iow altitude operations between NAS Oceana and NALF Fentress LTO w/o hot ref. = landing and takeoff cycle without hot refueling idle LTO w/ hot ref. = landing and takeoff cycle with hot refueling idle

GCA = ground control approach lb = pounds

TPY = tons per year

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		PM10	Total	(TPY)	17.70		13.17		0.00	0.00		0.0	30.87	22.10		16.91	:	00.0	0.00		0.00	39.01		22.58	1	25.24	0.00	0.00	47.82
		PN	per operation	(lb)	3.37		3.64	100	0.00	0.00		0.00		3.37	: !'	3.64		0.00	00.0		0.00	:	:	3.37		3.64	0.00	0.00	
		H	Total	(TPY)	1.37		1.33		0.28	3.04	2	67.0	6.81	1.70		1.71		0.00	2.59		0.13	6.14	;	1.74	į	2.55	0.00	2.59	6.88
		802	per operation	(qp)	0.26		0.37		0.52	0.24	7.0	0.14		0.26		0.37		0.52	0.24		0.14			0.26		0.37	0.52	0.24	
			Total	(TPY)	7.66		2.49		8.51	5.29	30 61	13.05	37.00	9.56		3.19		0.00	4.51	; ;	2.12	19.39		9.77		4.77	0.00	4.51	19.05
	RESS	02	per operation	<b>(g</b> )	1.46		69:0		15.85	0.42	3,5	2.35		1.46		69.0		15.85	0.42		2.35			1.46		0.69	15.85	0.42	
<b>4</b>	AIRCRAFT EMISSIONS AT NALF FENTRESS FOR 1993 AND 1996-1999	×	Total	(TPY)	31.53		46.34		3.38	54.89	0.00	10.50	146.63	39.36		59.52		00'0	46.82		1.71	147.41		40.21		88.85	00.0	46.82	174.88
ARS 5	FOR 1993 AND 1996-1999	NOX	per operation	(qp)	6.00		12.83		6.29	4.38	***	1.89		90.9		12.83		67.9	4.38		68'1			9009		12.83	6.29	4.38	
	AIRCRAFT F	(9)	Total	(TPS)	3.39		1.17		5.40	137		2.16	13.48	423		1.50		00'0	1.17		0.35	7.25		4.32		2.24	000	1.17	7.73
		9) DOA	per operation	<b>e</b>	99.0		0.32			0.11		0.39		0.65		0.32		. 10.05	0.11		0.39			0.65		0.32	10.05	11.0	
		Number of	perations/Yea		10,311		7,226		1,074	25,058		11,086	54,955	13,124		9,281		0	21,374		1,805	45,583		13,406		13,854	0	21,374	PE9 87
		Operation	Type	•	Touch&Go		Touch&Go		Full LTO	Touch&Go		Touch&Go		Touch&Go		Touch&Go		Full LTO	Touch&Go		Touch&Go			Touch&Go		Touch&Go	Full LTO	Touch&Go	
		Type of	Aircraft		F-14A		F-14B/D		E-2/C-2	The same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the same of the sa		9-V	Total	 F-14A		F-14B/D		E-2/C-2		1	A-6	Total		F-14A	:	F-14B/D	E-2/C-2		Total
					1993	<u>:</u>	-	<u> </u>		i	<u>i</u>			9661	·		:	<u>.l.,.,</u>	1		· barrer			1661	<u>·                                      </u>		<u></u>	<u></u>	_1_

				Total	(YAL	16.25		26.72	 17.43		00.0	00.0	60.41		16.25		26.72	:	27.40	:	00	0.00	27
			PM10		_	I	-	3		ļ.,	0	0	)9		1	-	26		27	:	0	0	
				per operation	<b>a</b>	3.37		3.64	2.62		0.00	00.00			3.37		3.64		2.62		0.00	0.00	:
			12	Total	(TPY)	1.25		2.70	131		0.00	2.59	7.85		1.25		2.70		2.05		00.0	2.59	000
			802	per operation	<b>(a)</b>	0.26		0.37	0.20		0.52	0.24		1	0.26		0.37		0.20		0.52	0.24	
				Total	(TPY)	7.03		5.05	5.26		0.00	4.51	21.85		7.03		5.05		8.27		00.0	4.51	70 70
	TRESS		00	per operation	(g)	1.46		69.0	0.79		15.85	0.42			1.46		69.0		0.79		15.85	0.42	
64.	ARS 5 AIRCRAFT EMISSIONS AT NALF FENTRESS	1996-1999	1.0	Total	(TPY)	28.94		94.07	40.13		0.00	46.82	209.95		28.94		94.07	× 2	63.05		0.00	46.82	327 00
Table F-49	ARS 5 EMISSIONS A	FOR 1993 AND 1996-1999	NOX	per operation	<b>(a)</b>	90'9		12.83	6.04		629	4.38			6.00		12.83		6.04		6.29	4.38	
	AIRCRAFT			Total	(TPV)	3.11		237	1.34		00'0	1.17	7.99		3.11		2.37		2.10		00.0	1.17	2.0
			9)	per operation	(p)	0.65		0.32	0.20		10.05	110			0.65		0.32		0.20		10.05	0,11	W. 1940 1970 1970
			200	perations/Yea		9,647		14,668	 13,285		0	21,374	58,974		9,647		14,668		20,876		0	21,374	292 99
			Operation	Type		Touch&Go		Touch&Go	Touch&Go		Full LTO	Touch&Go			Touch&Go		Touch&Go		Touch&Go		Full LTO	Touch&Go	
			Type of	Aircraft		F-14A		F-14B/D	F/A-18	1	E-2/C-2		Total		F-14A		F-14B/D		F/A-18		E-2/C-2		Total
						8661				i					1999	ليــــــل	1						
	-									<del></del>								-10					

(1) F-14 operations for 1996 and 1998 proportioned between F-14A and F-14B/D using annual aircraft population mix at Oceana.

(2) 1993 Touch and Go proportioned from air traffic operation records and number of interfacility flights.

(3) 1997 operation data taken from 'baseline scenario' data in Wyle (1997).

(4) A-6 aircraft assumed decommissioned by 1997.
(5) 1999 and transient aircraft operations derived from NASMOD analysis (ATAC 1997). 1996 and 1998 E-2/C-2 operations assumed same as 1999.
(6) Aircraft VOC reported as HC in the form CHy/x.
(7) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

interfacility = low altitude operations between NAS Oceana and NALF Fentress GCA = ground control approach LTO = landing and takeoff cycle lb = pounds
TPY = tons per year

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			WOX		N	NOX	Ω	Ω	203	72	PM	PM-10
	Cons (gg	Fuel Consumption (gal/yr)	Ilv1000 gal	Total (TPY)	lb/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	lb/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1993 Tow Tractors: (a)												
A/S32A-30A	<b>6</b> 0	8960	64.60	0.29	436.67	96'1	268.50	1.20	31.10	0.14	46.50	0.21
TA-35		254	8.60 0	10:0	436.67	90.0	268.50	0.03	31.10	0.00	46.50	10.0
MD-3/A/S32A-31A		4843	64.60	0.16	436.67	901	268.50	9.65	31.10	80.0	46.50	0.11
TA-75	-	17115	122.00	1.04	146.00	1.25	3250.00	27.81	5.20	0.04	8.27	0.07
A/S32A-42	7	7200	64.60	0.23	436.67	1.57	268.50	0.97	31.10	0.11	46.50	0.17
JG-75		104	122.00	100	146.00	10'0	3250.00	0.17	5.20	000	8.27	000
A/S32A-30		897	122.00	0.05	146.00	0.07	3250.00	1.46	5.20	00.0	8.27	0.00
Flight Line Flectric Power !	ctric Power Units											
NC8A (b)		4926	49.23	100	604 17	4.51	130 15	260	39.73	0 30	42.47	0.12
NC10C (6)	3	3180	49.23	0.08	604.17	96.0	130.15	0.21	39.73	90.0	42.47	0.07
Jet Engine Start Units	72.	71037	1	•	28.8		190 15	44.4	46.76	60.0	74.74	K
A/M4/A-4/NC	+	1932	49.23	3,6	) t	) (F 0)	130.15	2.73	39.73	0.85	42.47	68.0
A/34/A-1 (0)	4	117	27.53	70.0	1004	77.0	130.13	000	39.73	10.0	47.47	0.02
G1C-93 (c)	1	1010	C) in	3	00°C	70'D	14.00	0.0	0.34	9.0	0.00	00.00
Miscellaneous: (b.	(9)										-	
A/M32C-17		2105	49.23	20.0	604.17	0.64	130.15	0.14	39.73	0.04	42.47	0.04
A/M27T-5		066	49.23	0.02	604.17	0.30	130.15	90'0	39.73	0.02	42.47	0.02
A/M42M-2		720	49.23	0.02	604.17	0.22	130.15	0.03	39.73	0.01	42.47	0.02
HLU-196	00	8400	415.11	1.74	223.31	0.94	06.6858	36.08	11.51	0.05	T3.70	90.0
		Total		5.13		26.43		72.65		1.71		2.00
1996 Tow Tractors: (a)									ļ į			
A/S32A-30A		9000	8. 39.	190	436.67	4.15	268.50	2.55	31.10	0.30	46.50	0.44
18-55	1	450	9.4.5 O. (2	70.0 70.0	430.07	0.10	726.50	0.06	31.10	10.0	46.50	0.0
TA. 75 (TAING AS)		1600	00 tc1	0 0	450.07 146.00	0 t	1250 00	7.60	5.10	0.00	46.30	0.11
A/S17 A-47		7000	64.60	1 35 0	436.67	17.	268 50	7.78	31.10	0.00	46 50	0.01
16.75		104	122.00	100	146.00	100	3250.00	0.17	5.20	000	8.27	000
A/S32A-30	2	2900	122.00	0.18	146.00	0.21	3250.00	4.71	5.20	10.0	8.27	0.01
	THE TAXABLE PARTY AND ADDRESS OF TAXABLE PARTY.									:		:
Flight Line Electric Power	Onits											: ;
NC8A (b)		12800	49.23	0.32	604.17	3.87	130.15	0.83	39.73	0.25	42.47	0.27
NC10C (6)	[	3500	49.23	60'0	604,17	90'T	130.15	0.23	39.73	0.07	42.47	0.07
Jet Engine Start Units	t Units									***		
A/M47A-4/NCPP-105 (b)	(g)	37000	49.23	16'0	604.17	11.18	130.15	2.41	39.73	0.74	42.47	0.79
GTC-85 (c)	3	3000	6170	000	3.88	100	14.83	0.02	0.54	00.0	0.00	0.00
1,2	7.1											
Miscellaneous: (9)		2400	18.48	20.00	200.00	1	130 15	21.0	20.73	200	67.47	200
A/M32C-1/		2400	28.62	9 3 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 6	130.13	0.10	39.73	0.00	42.47	0.00
A MAZNA 2 (aur cond.)		200	20.03	9 2		7,7	- 1	21.0	39.73	0.00	42.47	CO C
HI II. 196		35					Г	2	39.73	50.5	14.74	20.0
21.0711				AND PARTY AND PARTY.	0 21 1 2 1 C C C C	THE COLUMN		110	1 5 1	000	12.70	2

			DOA	5	NOX	×	03	D	SO2	12	01-M4-10	10
		Fuel Consumption (gal/yr)	182 000 [AI	Total (TPY)	16/1000 gal	Total (TPY)	lb/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)	1b/1000 gal	Total (TPY)
1997	Tow Tractors: (a)											
	A/S32A-30A	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
	TA-35	009	64,60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
	A/S32A-42	23000	64.60	• 0.74	436.67	5:02	268.50	3.09	31.10	0.36	46.50	0.53
	TA-75	1200	122.00	1.04	146.00	1.25	3250.00	1.95	5.20	00.0	8.27	0.00
	Flight Line Floatic Dougs Unite											
	NC8A (b)	16000	£C 0P	0.30	60d 17	4 83	130 15	104	30 73	0.33	77.77	0.34
	NC10C (b)	0009	49.23	0.15	604.17	181	130.15	0.39	39.73	0.12	42.47	0.13
	. 11											
	Jet Engine Start Units A/M47A-4/NCPP-105 (b)	45000	49.23		604 17	11.50	130 15	7 93	39.73	080	42.47	90.0
	GTC-85 (c)	3500	0.13	0.00	3.88	10'0	14.83	0.03	0.54	0.00	0.00	0.00
	Miscellaneous: (b)	0000	10.02	- C								
	A/M32C-1/	3000	49.23	U.U.	604.17	56 60 60 60 60 60 60 60 60 60 60 60 60 60	130.15	0.20	39.73	90.0	42.47	0.06
	C-1 / ZIVI/Y	2000	49.43	30.8	71.4.	18.5	130.15	0.20	39.73	0.00	42.47	0.09
	A/M42M-2 HI 11-196	1600	17,71	4.04 6.04	904.17	0.48	130.15	0.10	39.73	0.03	42.47	0.03
		Total		4.57		34.01	02.20	18.73		2.20	2	2.66
8661	Tow Tractors: (a)											
	A/S32A-30A (MOGAS)	22000	64.60	0.71	436.67	4.80	268.50	2.95	31.10	0.34	46.50	0.51
	A/S32A-30	3500	122.00	0.21	146.00	0.26	3250.00	5.69	5.20	0.01	8.27	0.01
	TA-35	009	04.60	0.02	436.67	0.13	268.50	0.08	31.10	0.01	46.50	0.01
	A/S32A-42	23000	04.60	0,74	436.67	5.02	268.50	3.09	31.10	0.36	46.50	0.53
	Flight Line Electric Power Units	si										
	NC8A (b)	00091	49.23	0.39	604.17	4.83	130.15	1 04	39.73	0 32	47 47	Pt 0
	NC10C (6)	8000	49.23	0.20	604.17	2,42	130.15	0.52	39.73	0.16	42.47	0.17
	In Function Come I laster											
	A/M47A-4/NCPP-105 (b)	47000	49.23	1.16	604.17	14.20	130.15	3.06	39.73	0.93	42.47	100
	GTC-85 (c)	3500	0.13	000	3.88	10'0	14.83	0.03	0.54	0.00	00.0	0.00
	Miscellaneous: (b)	7000	1000		41.500			700		000		i
	A/M32C-1/	4000	49.23	2 8	7 to 100	77	130.15	0.26	39.73	0.08	42.47	0.08
	AMAZI 1-3	4000	22.54	21.0	77.00	17.1	130.15	0.20	39.73	0.08	42.47	0.08
	2017-111H			E C	334.41	9 6	130.13	0.10	39.73	0.03	47.47	0.03
_		8				The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		2	- -	=	13.70	5

Fiight Line Electric Fower Units NC8A (b) NC10C (b) NC10C (b) Jet Engine Start Units AM47A-4/NCPP-105 (b) GTC-85 (c) Miscellaneous: (b) AM32C-17		1b/1000 gal 64.60 64.60 64.60 64.60 64.50 64.50 64.50 64.50 64.50 64.50 49.23 49.23 49.23	VOC Total (TPY) 0.72 0.21 0.02 0.39 0.39 0.00 0.00	16/1000 gail 436.67 146.00 436.67 436.67 604.17 604.17 604.17	MOX Total (TPY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (APY) (A	268.50 3250.00 268.50 268.50 268.50 130.15 130.15 14.83		SOZ 1b/1000 gal 5.20 5.20 5.20 5.20 5.20 39.73 39.73 39.73 39.73		8.27 8.27 8.27 8.27 8.27 42.47 42.47 42.47 42.47	gal (TPY) 0.09 0.09 0.10 0.10 0.17 0.17 0.17 0.00
A/M42M-2 HLU-196	1600	49.23	0.04	604.17 223.31	0.48	130.15	0.10	39.73	0.03	42.47 13.70	0.03
A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR	70	415.11	0.00	223.31	0.00	8589.90	0.09	11.51	0.00	13.70	0.00
	07	415.11	0.00		0.00	06.6868	0.09	10:11	0.00	13.70	0.00
	2 Start Units 4/NCPP-105 (b) 2 cous: (b) 7	VCPP-105 (b)	### 8000 ### 8000 #### 8000 #### 8000 #### 8000 #### 8000 ########	## 8000   49.23   10   10   10   10   10   10   10   1	### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Acres   ### Ac	tart Units         49.23         0.20         604.17           VCPP-105 (b)         47000         49.23         1.16         604.17           War. (b)         4000         49.23         0.00         3.88           Mar. (b)         4000         49.23         0.10         604.17           1600         49.23         0.10         604.17           20         49.23         0.10         604.17           1600         49.23         0.10         604.17           1600         49.23         0.04         604.17           1600         223.331         70           1601         415.11         0.00         223.331	tart Units         49.23         0.20         604.17         2.42           VCPP-105 (b)         47000         49.23         1.16         604.17         14.20           us: (b)         4000         49.23         0.10         604.17         1.21           us: (b)         4000         49.23         0.10         604.17         1.21           4000         49.23         0.10         604.17         1.21           1600         49.23         0.10         604.17         1.21           20         415.11         0.00         223.31         0.08           20         415.11         0.00         223.31         0.00	tart Units         49.23         0.20         604.17         2.42         130.15           ACPP-105 (b)         47000         49.23         1.16         604.17         14.20         130.15           Ms: (b)         4000         0.13         0.00         3.88         0.01         14.83           Ms: (b)         4000         49.23         0.10         604.17         1.21         130.15           4000         49.23         0.10         604.17         1.21         130.15           1600         49.23         0.10         604.17         1.21         130.15           20         415.11         0.00         223.31         0.00         8589.90           20         415.11         0.00         223.31         0.00         8589.90	tart Units         8000         49.23         0.20         604.17         2.42         130.15         0.52           ACPP-105 (b)         47000         49.23         1.16         604.17         14.20         130.15         3.06           us: (b)         4000         49.23         0.00         3.88         0.01         14.83         0.03           us: (b)         4000         49.23         0.10         604.17         1.21         130.15         0.26           4000         49.23         0.10         604.17         1.21         130.15         0.26           1600         49.23         0.10         604.17         1.21         130.15         0.26           20         4000         49.23         0.10         604.17         1.21         130.15         0.26           20         4000         49.23         0.04         604.17         0.48         130.15         0.10           20         415.11         0.00         223.31         0.00         8589.90         0.09           Total         17.22         17.22	tart Units         80000         49.23         0.20         604.17         2.42         130.15         0.52         39.73           4CPP-105 (b)         47000         49.23         1.16         604.17         14.20         130.15         3.06         39.73           4CPP-105 (b)         47000         49.23         1.16         604.17         14.83         0.03         0.54           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73           1600         49.23         0.10         604.17         1.21         130.15         0.26         39.73           20         415.11         0.00         223.31         0.00         8589.90         0.00         11.51           Total         Total         3.66         3.4.66         17.22         17.22	tart Units         80000         49.23         0.20         604.17         2.42         130.15         0.52         39.73         0.16           ACPP-105 (b)         47000         49.23         1.16         604.17         14.20         130.15         3.06         39.73         0.93           War. (b)         4000         49.23         0.10         604.17         1.21         14.83         0.03         0.54         0.00           war. (b)         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08           4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08           20         4000         49.23         0.10         604.17         1.21         130.15         0.26         39.73         0.08           20         415.11         0.00         22.3.31         0.00         8589.90         0.10         39.73         0.00           20         415.11         0.00         22.3.31         0.00         8589.90         0.09         11.51         1.73           1.73         1.73         1.73         1.73         1.73

Footnotes:

(a) Emission factors from AP-42 Volume II for gasoline-powered wheeled tractor for TA-75, JG-75, & A/S32A-30 and diesel-powered wheeled tractors for all others.
(b) Emission factors from AP-42 Volume I for Uncontrolled gasoline and diesel industrial engines SCC 20200102, 20300101, and 2300301..
(c) Emission factor from USEPA 1992 for aircraft auxilliary power units.

Notes:
(1) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.
(2) Conversion from lb/MMBtu assuming heating value for JP-5 of 137,000 Btu/gallon.

			EMI	ISSION RATES	EMISSION RATES FOR SINGLE ENGINE MAINTENANCE RUN-UPS AT NAS OCEANA (IN-FRAME ENGINE TESTING)	IGLE ENGINE MAINTENANCE (IN-FRAME ENGINE TESTING)	TENANCE RU	IN-UPS AT NA	SOCEANA				
Engine (Aircraft)	Power Setting (1)	Time in Power Setting (1)	Fuel Flow		E CIP	Emission Factor	10)			(Ib/s	Emission Rates	1	
		(minutes)		(2) OC	*ON	00	802	PM10	VOCE	NOX .	00	SO2	PM10
TF30-P-412A	Low Power												
(F-14A)	ldle	7.00	15.3	31.42	3.22	55.51	0.40	8.96	3.37	0.33	5.96	0.04	0.96
	75%	12.00	71.7	1.48	10.74	3.43	0.40	5.70	1.27	9.24	2.95	0.34	8.4
	Total								4,68	9.39	16:8	0.39	5.87
-	11:11												
	High Power	90 0											
	Idle	10.00	15.3	31,42	3.22	55.51	0.40	8.96	4.81	0.49	8.49	90:0	1.37
	75%	25.00	71.7	1.48	10.74	3.43	0.40	5.70	2,65	19.25	6.15	0.72	10.22
	100% (Mil)	10.00	117.5	0.77	19.60	1.38	0.40	2.98	060	23.03	1.62	0.47	3.50
_	A/B (Z5)	4.00	796.7	0.20	4.79	10.77	0.40	0.00	0.64	15.26	34.32	1.27	00.00
200	Fotal			2					9.00	\$8.04	50.58	2.52	15.09
(F-14B/D)	Low rower	90.9	201	77	1	03.71	04.0	00					
(2)	76%	05.61	133.0	20.0	77.7	10.00	0.40	12.38	0.30	0.27	79.1	0.04	1.21
	0/6/	12.30	133.0	975	19,01	0.76	0.40	4.30	0.43	32.60	1.26	0.67	7.15
	Total								0.79	32.87	2.88	0.70	8.36
													!
	High Power												 
	Idle	10:00	19.5	3.65	2.77	16.60	0.40	12.38	17.0	0.54	3.24	0.08	2.41
-	75%	20.00	133.0	0.26	19.61	0.76	0.40	4.30	0.69	\$2.16	2.02	90'1	T 11.44
	- IKB	15.00	195.3	0.40	28.63	0.84	0.40	2.81	** <b>1.1</b>	83.87	2.46	1.17	8.23
	A/B(Max)	4.00	945.0	613	9.22	23.12	0.40	00.0	0.49	34.85	87.39	1.51	0.00
1 63 10 010	1008								3.07	171.43	95.11	3.83	22.08
99-1-76-	LOW FOWER	16.00	11.3		Xr.	27.70	9	000			100		ļ
(94)	76 970	00.01	11.5	200	2 3 3 5	03.78	0.40	00.0	8.32	200	10.84	0.07	0.00
_	P/ 70-0/	0.01	0.7/	70'0	10.10	3.00	0.40	00.00	0.48	17.1	2.16	0.29	0.00
						-			38°2	7.58	13.00	0.36	0.00
	High Power											:	
	Idle	15.00	11.3	48.96	1.79	63.78	0.40	00.0	8.30	0.30	10.81	0.07	<u> </u>
	78-82%	\$.00	72.0	0.67	10,10	3.00	0.40	00.00	0.24	3.64	801	71.0	00.00
	94-100%	8.00	122.8	0.93	13,05	0.71	0.40	00.00	16:0	12.82	0.70	0.39	000
	Total			Programme and the second					9.45	16.76	12.59	09.0	0.00
F404-GE-400	Low Power	7	1.81			1 1 1 1 1 1	ļ9  -	1				. :	: :
(61-4/1)	Idic	0.30	10.4	28.18	F10	137.34	0.40	12.38	3.93	0.08	9.28	0.03	0.84
	76%	3.50	109.0	0.35	14,80	1.09	0.40	6.10	0.13	5.65	0.42	0.15	2.33
	Total								4.07	5.72	9.70	0.18	3.16
			:			:				Manager Co.			
	High Power	100	i					:					
	1dle	13.00	10.4	38.18	1.16	137.34	0.40	12.38	7.87	0.16	18.57	0.05	1.67
	1070	6.50	109.0	6.50	14.80	1.09	0.40	4.00	0.32	13.71	1.01	0.37	3.71
	2	2.00	143.1	ICS	01:07	G.	0.40	7.81	77.0	25.81	6.73	0.29	7.01
						- H	1						

Notes.

(2) Power setting and time in power setting for F-14 A, F-14B/D, F/A-18 aircraft, and A-6 provided by AESO and COMNAVAIRLANT.

(2) Aircraft VOC reported as HC in the form CHy/x

(3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

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(4) Aircraft VOC = volatile organic compounds

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(4) Aircraft VOC = volatile organic compounds

(5) Shaded areas indicate polluting subject to emission budget requirements in the Hampton Roads maintenance plan.

(5) Shaded areas indicate polluting subject to emission budget requirements in the Hampton Roads maintenance plan.

(6) Shaded areas indicate polluting subject to emission budget requirements in the Hampton Roads maintenance plan.

(7) Shaded areas indicate polluting subject (same as Military)

(7) E author Mox.

(8) Shaded areas indicate polluting subject (same as Military)

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM 10 = particulate matter

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			Cloud	Cialo Pacodia Gar		ARS 5							
				EMISSIONS FROM SING	LE ENGINE FO	IE IN-FRAME MAIN I EN FOR 1993 AND 1996-1999	GLE ENGINE IN-FRAME MAIN ENANCE KUN-UFS AT NAS OCEANA FOR 1993 AND 1996-1999	KUN-UPS AT F	AAS OCEAN,			-	
	lype of	Kun-up mode		10		Z	×	93		202		PN	PMIO
	Aircraft (Engine) and Number of Aircraft		Single Engine Run-ups/yr	Single Engine LD per Single Run-ups/yr Engine Run-up	TPY)	Lb per Single Engine Run-un		Lb per Single Engine Run-un	Total (TPY)	Lb per Single Engine Run-un	Total	Lb per Single Engine Run-un	Total (TPV
1993	F-14A (TF30-P-412A)	Low Power	9,617	4.65		626	46.09	16.8	42.83	0.39	1.86	5.87	28.21
	80	High Power	274	00.6	1.23	58.04	7.94	50.58	6.92	2.52	0.35	15.09	2.06
	F-14B/D (F110-GE-400)	l ow Power	3 365	0.70	# T	43.83	55.30	7 88	4 85	02.0	1 10	71 0	20 11
	55	High Power	9/1	3.07	0.27	171.43	15.11	95.11	8.38	3.83	0.34	22.08	1 95
	A-6 (J-52-P-8B)	Low Power	10,320	8.80	45.42	7,58	39.09	13.00	67.08	0.36	1.84	00.00	00.0
	98	High Power	292	9.45	1.38	16.76	2.45	12.59	1.84	09:0	60.0	00.00	0.00
	A			Total	71.97		165.99		131.90		5.65		46.27
1996	F-14A (TF30-P-412A)	Low Power	11,180	4.65	25.96	65.6	46,09	16'8	42.83	0.39	1.86	5.87	28.21
	93	High Power	318	00'6	143	58.04	7.94	50.58	6.92	2.52	0.35	15.09	2.06
	TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO 000 TO												
	F-14B/D (F110-GE-400)		4,221	67.0	1.66	32.87	55.30	2.88	4.85	0.70	 8-:	8.36	14.06
	69	High Power	221	3.07	0.34	171.43	15.11	95.11	8.38	3.83	0.34	22.08	1.95
	A 671 69 D 9B)	Low Downer	V87 I			27.2	474	0.40	200	210	*** 8		10
	14	High Power	48	0.22	100	8.00	<b>LP</b> 0	0.75	000	0.13	001	2.33	20.1
		0									200	0	5
	F/A-18 (F404-GE-400)	Low Power	200	4.07	0.41	5,72	0.57	9.70	16.0	0.18	0.02	3.16	0.32
	12	High Power	49	8.54	0.21	40.60	66.0	42.21	1.03	1.09	0.03	7.39	0.18
	***************************************			Total	30.13		131.19		65.36		3.91		48.77
1661	F-14A (TF30-P-412A)	Low Power	11,420	4.65	26.52	9.59	54.74	8.91	50 86	0 39	7.51	5 87	11 40
	, 38	High Power	325	00.6	1.46	58.04	9.43	50.58	8.22	2.52	0.41	15.09	2.45
											1	:	
	F-14B/D (F110-GE-400)	<del>!</del> .	6,302	0.79	2.48	32.87	103.57	2.88	80.6	0.70	2.22	8.36	26.33
	103	High Power	330	3.07	0.51	171.43	28.30	95.11	15.70	3.83	0.63	22.08	3.65
	100												. !
	F/A-18 (F404-GE-400)	Low Power	700	4.07	141	2/72	0.57	9.70	0.97	0.18	0.02	3.16	0.32
	12	High Power	49	8.54	0.21	40.60	0.99	42.21	1.03	1.09	0.03	7.39	0.18
	_	_		2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	A CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH								

			EMISSIC	EMISSIONS FROM SING	LE ENGINE FO	ARS 5 ARS 5 LE ENGINE IN-FRAME MAINTENANCE RUN-UPS AT NAS OCEANA FOR 1993 AND 1996-1999	INTENANCE 96-1999	RUN-UPS AT 1	NAS OCEAN.	₹			
	Type of	Kun-up mode	Number of	YOC	(6)	YON	X,	٥	03	802	72	PMIO	10
	Aircraft (Engine) and Number of Aircraft		Single Engine Run-ups/yr	Lb per Single Engine Run-up	Teta (Yet)	Lb per Single Engine Run-up	Total	Lb per Single Engine Run-up	Total (TPY)	Lb per Single Engine Run-up	Total (TPY)	Lb per Single Engine Run-up	Total
											-		
8661	F-14A (TF30-P-412A)	Low Power	6,012	4.65	13.96	65.6	28.82	16.8	26.78	0.39	00.0	5.87	17.63
	20	High Power	171	00'6	0.77	58.04	4.96	50.58	4.32	2.52	00.0	15.09	1.29
		L.,											
	F-14B/D (F110-GE-400)	Low Power	5,936	6.79	2.34	32.87	97.36	2.88	8.55	0.70	2.09	8.36	24.80
	76	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09:0	22.08	3.44
													-
	F/A-18 (F404-GE-400)	Low Power	7,550	4.07	15.35	5.72	21.61	9.70	36.62	0.18	0.68	3.16	11.94
	132	High Power	462	8.54	1.97	40.60	9.38	42.21	9.75	60.1	0.25	7.39	1.71
				Total	34.87		189.02		100.83		3.62		60.81
6661	F-14A (TF30-P-412A)	Low Power	6,012	4.65	13.96	65.6	28.82	8.91	26.78	0.39	1.16	5.87	17.63
	20	High Power	171	00'6	6.77	58.04	4.96	50.58	4.32	2.52	0.22	15.09	1.29
	F-14B/D (F110-GE-400)	_	5,936	0.79	2.34	32,87	97.56	2.88	8.55	0.70	2.09	8.36	24.80
	26	High Power	311	3.07	0.48	171.43	26.69	95.11	14.81	3.83	09:0	22.08	3.44
													:
	F/A-18 (F404-GE-400)	Low Power	7,550	4.07	15.35	5.72	21.61	9.70	36.62	0.18	99.0	3.16	11.92
	132	High Power	462	8.54	1.97	40.60	9.38	42.21	9.75	1.09	0.25	7.39	1.71
													. !
		_		Lyte		立の場合です。 10 10 10 10 10 10 10 10 10 10 10 10 10	10000	_	1000	_	-		1007

(1) Number of maintenance run-ups for F-14A, F-14B/D, and F/A-18 aircraft in 1997 and 1999 are from Wyle (1997). 1993, 1996, and 1998 maintenance run-ups were scaled from 1997 based on number of aircraft stationed at NAS Ocea (2) Maintenance run-ups for A-6 based on actual 1993 data. 1996 data scaled using 1993 data.
(3) Aircraft VOC reported as HC in the form CHy/x
(4) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:

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							Table F-53							
					STATIO	STATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 5 FOR 1993 AND 1996-1999	IRCE EMISSIONS AT NA: FOR 1993 AND 1996-1999	VT NAS OCEAN	IA - ARS 5					
Source		1993					9661					1997		
Type	NOX I DOX	င္ဝ	202	PMI0	204	NOx	ည	202	PMIO	COC	NOx	93	202	PMI0
Stationary Sources:								-						
Boilers	1.19 32.32	8.31	22.09	3.84	0.78	29.13	7.52	23.76	3.63	0,78	29.13	7.52	23.76	3.63
Generators	6.71 8.67	1.87	0.57	19.0	1/0	8.67	1.87	0.57	19.0	2.11	27.87	7.27	3.77	2.21
Engine Testing	3.26 19.89	26.03	0.94	2.28	1.95	22.13	30.07	10.1	2.78	3.75	29.99	39.88	1.25	3.71
					, *									
JP-5 Fuel Handling	0.00	0.00	00.00	00.0	0.46	000	00.0	00.00	0.00	0.54	0.00	0.00	00.0	00.0
														1
Service Station	19.35 0.00	00.0	00.00	0.00	4.46	00'0	0.00	00.00	00.00	4.67	00'0	00'0	00.0	00.0
													:	:
Painting	19:30 0:00	0.00	00.00	000	13.29	98'0	0.00	00.00	0.00	14.00	000	0.00	00.00	00.00
Construction:	000 000	0.00	0.00	00.0	000	00.0	00'0	00.0	00.0	000	00'0	00.0	00.00	00.0
Total	44.41 60.88	36.21	23.60	6.73	22,65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55

				- Company	Tabl	Fable F-53	Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Contro			
			ST	ATIONARY SC	OURCE EMISS FOR 1993 AI	RCE EMISSIONS AT NAS FOR 1993 AND 1996-1999	FATIONARY SOURCE EMISSIONS AT NAS OCEANA - ARS 5 FOR 1993 AND 1996-1999	vo		
Source			8661					1999		
Type		NOX	00	S02	PM10	20A	YON	00	802	PMID
Stationary Sources:										
Boilers	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Testing	6.70	54.02	67.01	1.81	9.72	02.6	54.02	67.01	1.81	9.72
JP-5 Fuel Handling	18'0	00'0	0.00	0.00	0.00	0.90	0.00	00.0	0.00	0.00
Service Station	6.40	00.0	00.0	0.00	0.00	6.72	0.00	00.00	0.00	0.00
TO										
Painting	34.12	0.00	00.00	0.00	00.00	41.00	000	0.00	0.00	0.00
2										
Construction:	0.00	0.00	0.00	0.00	0.00	1.96	19.50	6.33	1.85	3.55
Total	53.76	109.02	96.08	28.40	15.31	63.01	128.52	87.29	30.25	18.86
		- Constitution of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract		Y			The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon			

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key: VOC = volatile organic compounds

NOx = oxides of nitrogen

CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property   Property							Tal	Table F-54							
Power (mine)         Time in Power (s) (b/min)         Checlated Fuel Flow (b/mine)         Checlated Fuel Flow (b/mine)         Checlated Fuel Flow (b/mine)         Emission Ratio (s) (b/mine)         Emission Ratio (s) (b/mine)         Emission Ratio (s) (b/mine)         Emission Ratio (s) (b/mine)         Emission Ratio (s) (b/mine)         Checlated Fuel Flow (cond.)         SOP (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d					EMISS	ION RATES FO	R AIRCRAFT F SINGLE ENGIN	ENGINE TEST VE IN TEST CI	S AT NAS OCI ELLS)	EANA - ARS S				and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of t	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s
Setting (I)         Setting (II) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (III) (	Engine	Power	Time in Power	L	Calculated Fuel		E	ission Factor (3	(			Single	Engine Test Em	issions	
Characteries	(Aircraft)	Setting	Setting (1)		Usage (2)		<u>a</u>	1000 lb fuell/er	1g)				(spunod)		
High   2860   1533   6312   3142   322   5551   0.54   289   1339   1338   0.23   0.29   1.25   0.19   1.25   0.19   1.25   0.19   1.25   0.19   1.25   0.19   1.25   0.19   1.25   0.19   0.15   1.25   0.19   0.15   1.25   0.19   0.15   1.25   0.19   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.15   0.		D	(minutes)	,	(gallons/test)			03	,	PM10	VOC (4)	NOX	03	SO2	PM10
75%         5.00         71.67         5.270         1.48         10.74         3.43         0.54         7.88         0.651         3.85         1.23         0.19           AB         23.00         77.40         20.177.46         0.20         4.79         1.0.77         0.54         7.98         2.144         2.26.32         2.88         0.96           AB         22.00         796.67         2577.46         0.20         4.79         1.0.77         0.54         1.0.98         2.144         2.26.32         2.88         0.96           Total         17.00         19.50         154.85         3.97         2.74         15.75         0.54         12.38         4.18         2.89         16.58         0.57           AB         11.00         19.50         154.85         3.97         2.74         15.75         0.54         2.81         1.154         1.13         3.41           S17         44.00         19.30         9.90         1.264         4.42         0.54         2.81         1.154         4.83         1.174         4.83         1.27           AB         11.30         9.52         1.28         0.54         2.81         1.174         4.85         <	TF30-P-412A		28.00	15.33	63.12		3.22	55.51	0.54	8.96	13.49	1.38	23.83	0.23	3.85
National Commutation   13.00   77.40   261.79   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1.00   1	(F-14A)		5.00	71.67	52.70	1.48	10.74	3.43	0.54	7.98	0.53	3.85	1.23	0.19	2.86
A/B         2200         796.67         257.46         0.00         47%         10.77         0.54         0.00         3.55         83.95         188.76         9.46           Total         78.00         796.67         255.08         ***         10.77         0.54         12.38         4.18         2.89         16.78         0.57           Ide         54.00         19.50         154.85         3.57         2.74         157         0.54         2.81         1.18         2.89         16.58         0.57           81%         44.00         19.37         2.99         3.97         2.74         44.21         0.54         2.81         1.16         45.29         1.57         2.61           A.B         11.00         94.50         152.87         3.75         1.264         44.21         0.54         0.00         38.98         13.40         45.95         5.01           A.B         11.00         94.50         11.33         53.32         48.64         44.21         0.54         0.00         27.39         48.63         1.27         0.20           A.B         11.00         11.23         53.32         48.64         44.21         0.54         0.00			23.00	77.40	261.79	1.20	16.02	1.62	0.54	7.98	2.14	28.52	2.88	96'0	14.21
Total   78,00   1950   148.55   274   15.75   0.54   12.38   4.18   2.89   16.58   0.57   1.289   14.81   2.89   16.58   0.57   1.289   14.81   2.89   16.58   0.57   2.84   1.289   1.289   1.289   1.289   1.288   2.80   1.288   2.80   1.288   2.80   1.288   2.80   1.288   2.80   1.288   2.80   1.288   2.80   2.80   1.288   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80   2.80	_	A/B	22.00	796.67	2577.46	0.20	4.79	10.77	0.54	0.00	3.51	83.95	188.76	9.46	00:0
Idde		Total	78.00		2955.08					Per Test	99.61	117.70	216.70	10.85	20.91
Total   54 00   19 50   154 85   3977   2744   1575   0.54   12.38   4.18   2.899   16.58   0.57     81%   44.00   143.70   299.82   0.26   1961   0.76   0.54   2.81   1.64   123.99   4.81   3.41     81%   44.00   143.70   299.82   0.26   1961   0.76   0.54   2.81   1.64   123.99   4.81   3.41     AB   11.00   945.05   122.87   3.342.18   2.842   4.421   0.54   0.00   38.98   131.40   495.59   5.61     Total   134.00   122.83   325.14   1.08   13.05   0.71   0.54   0.00   1.73   0.055   1.77   1.19     Total   25.00   10.40   79.53   28.18   1.16   1.054   0.00   1.59   0.00   1.50   0.00     Total   25.00   10.40   79.53   28.18   1.16   1.17   0.40   0.13   3.14   0.40   0.13   0.40   0.13   0.40   0.13   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.13   0.40   0.14   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.18   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40   0.40															
81%         44.00         143.70         929.82         0.26         195.61         0.76         0.54         2.81         154         113.99         4.81         3.41           93%         25.00         198.22         728.75         0.31         28.53         1.08         0.54         2.81         1154         413.89         5.35         2.68           A/B         111.00         945.05         1528.76         3.37         1.264         44.21         0.54         0.00         28.98         486.33         1.27           Total         113.400         3342.18         3.75         1.76         6.378         0.54         0.00         17.75         0.65         486.33         1.27           Ground Idle         32.00         11.33         53.32         48.96         1.79         6.378         0.00         17.75         0.65         23.12         0.20           RP         18.00         12.28         2.36         48.56         1.05         0.71         0.54         0.00         1.74         0.65         2.81         2.81           7.5% Thust         2.50         38.34         1.05         6.34         10.54         0.54         0.00         1.74         0.	F110-GE-400	Idle	54.00	19.50	154.85	3,97	2.74	15.75	0.54	12.38	4.18	2.89	16.58	0.57	13.04
93%         25.00         198.22         728.75         0.31         28.53         1.08         0.54         2.81         154         14138         5.35         2.68           A/B         11.00         945.05         1528.76         3742.18         2.64         44.21         0.54         0.00         38.98         131.40         495.59         5.61           Total         13.400         3342.18         44.21         0.54         0.00         17.75         46.34         395.66         466.33         12.77           Ground Idle         32.00         11.33         53.32         48.96         1.79         0.71         0.54         0.00         17.75         0.65         1.57         1.19           RP         18.00         72.00         224.12         0.87         0.10         0.54         0.00         1.75         2.88         1.57         1.19           75% Thrust         25.00         38.33         140.92         0.87         0.10         0.54         0.00         1.71         5.08         1.19         0.54         0.54         0.00         1.91         6.08         1.83         1.84         1.84         8.84         1.84         1.84         1.74         1	(F-14B/D)	81%	44.00	143.70	929.82	0,26	19.61	0.76	0.54	2.81	1.64	123,99	4.81	3.41	17.71
A/B         11 00         945 05         1528.76         3.75         12.64         44.21         0.54         0.00         38.98         131.40         459.56         450.59         561           Total         1134.00         3342.18         2.00         1.73         6.378         0.54         0.00         17.75         0.65         23.12         0.20           Ground Idle         32.00         11.33         53.32         48.96         1.79         6.378         0.00         17.75         0.65         23.12         0.20           Toy         12.80         12.83         32.00         12.84         0.00         1.50         1.745         5.18         0.93           Africal Lbs Thrust         25.00         38.33         140.92         1.99         6.34         10.54         0.00         1.91         6.08         1.745         5.18         0.93           3k Lbs Thrust         25.00         38.33         140.92         1.99         6.34         10.54         0.54         0.00         1.91         6.08         1.84         1.84         1.84         1.84         1.84         1.84         1.84         1.84         1.84         1.84         1.17         1.17         0.40<		93%	25.00	198.22	728.75	0.31	28.53	1.08	0.54	2.81	1.54	141.38	5:35	2.68	13.92
Total   114.00   3142.18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   .		A/B	11.00	945.05	1528.76	3.75	12,64	44.21	0.54	00:00	38.98	131.40	459.59	5.61	0.00
Ground idle         32,00         11.33         53.32         48.96         1.79         63.78         0.54         0.00         17.75         0.65         23.12         0.20           RP         18.00         122.83         33.21.4         1.06         1.01         0.71         0.54         0.00         17.75         0.65         1.19           778. Thrust         25.00         12.80         1.29         6.34         0.00         1.59         5.18         0.93           1 Lbs Thrust         25.00         38.33         140.92         1.59         6.34         0.00         1.59         5.18         0.52           1 Lbs Thrust         25.00         38.33         140.92         6.34         0.54         0.00         1.59         5.18         0.52           1 Lotal         99.00         773.49         5.818         1.16         1.37.34         0.40         1.238         31.46         0.63         74.27         0.22           1 Lbs Thrust         34.00         13.60         5.20         1.17         0.40         6.10         6.10         0.63         74.27         0.22           App         34.00         473.28         2.81         2.22         231.12 </td <td></td> <td>Total</td> <td>134.00</td> <td></td> <td>3342.18</td> <td></td> <td></td> <td></td> <td></td> <td>Per Test</td> <td>46.34</td> <td>39,66</td> <td>486.33</td> <td>12.27</td> <td>44.73</td>		Total	134.00		3342.18					Per Test	46.34	39,66	486.33	12.27	44.73
Ground Idle         32.00         11.33         53.32         48.96         11.79         63.78         0.54         0.00         17.75         0.65         23.12         0.20           RP         18.00         122.83         325.14         1.08         13.05         0.71         0.54         0.00         1.50         1.75         5.18         0.93           75% Thrust         25.00         72.00         254.12         0.87         10.10         3.00         0.54         0.00         1.91         5.18         0.93           3k Lbs Thrust         25.00         38.33         140.92         1.99         6.34         10.54         0.54         0.00         1.91         5.08         1.01         0.52           10d         52.00         10.40         773.49         6.34         1.17         0.40         6.10         1.18         6.10         1.17         0.40         6.10         1.18         0.52         2.24         1.79         0.22           80%         34.00         473.28         28.80         0.13         9.22         23.12         0.40         6.10         6.18         1.79         0.57         1.79           Ann         80.09         473.28 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>															
RP         18.00         122.83         28.65         1.57         1.19           75% Thrust         24.00         72.00         254.12         0.687         10.10         3.00         0.54         0.00         4.59         5.18         0.93           75% Thrust         25.00         38.33         140.92         1.59         6.34         10.54         0.54         0.00         4.91         6.08         10.10         0.52           TOtal         99.00         773.49         6.34         1.054         0.54         0.00         4.91         6.08         10.10         0.52           Idle         52.00         10.40         79.53         58.18         1.16         137.34         0.40         6.10         6.10         6.13         74.27         0.22           80%         34.00         473.28         20.35         1.17         0.40         6.10         6.10         6.18         1.79         0.57           AB         3.00         473.28         20.80         0.13         9.22         23.12         0.40         0.10         0.10         0.13         0.57         1.79           AB         3.00         473.28         20.80         0.13         <	I-52-P-8B	Ground Idle	32.00	11.33	53.32	48.96	1.79	63.78	0.54	00'0	17.75	6.65	23.12	0.20	00.00
75% Thrust         24.00         72.00         254.12         0.87         10.10         3.00         0.54         0.00         1.50         1.745         5.18         0.93           3k Lbs Thrust         25.00         38.33         140.92         1.59         6.53         10.54         0.54         0.00         1.91         6.08         10.10         0.52           Total         99.00         10.40         79.53         58.18         1.16         137.34         0.40         12.38         31.46         0.63         74.27         0.22           80%         34.00         10.16         6.58.00         0.13         95.22         23.12         0.40         6.10         6.10         0.63         74.27         0.22           AB         3.00         473.28         2.08         0.13         9.22         23.12         0.40         6.10         6.10         0.18         8.72         5.24         1.79           Total         89.00         946.33         0.13         9.22         23.12         0.40         Per Test         33.12         97.43         11.234         2.57	(9-V)	IRP		122.83	325.14	801	13.05	0.71	0.54	00.0	2.39	28.85	1.57	1.19	00:0
3k Lbs Thrust         25.00         38.33         140.92         1.99         6.34         10.54         0.54         0.00         1.91         6.08         10.10         0.52           Total         99.00         10.40         773.49         8.34         1.16         137.34         0.40         12.38         31.65         6.03         74.27         0.22           Ros         11.10         0.40         6.10         6.10         6.10         6.10         6.13         3.72         5.24         1.79           AB         3.00         473.28         20.85         0.13         9.22         23.12         0.40         6.10         6.18         13.69         3.28 3         0.57           Total         89.00         946.33         0.33         946.33         12.34         2.57         12.34         2.57		75% Thrust		72.00	254.12		10,10	3.00	0.54	00.0	1.50	17.45	5.18	0.93	00:0
Total         99,00         773,49         6         6         773,49         284         284           Total         52,00         10,40         79,53         58,18         16         137,34         0.40         12,38         31,46         0.63         74,27         0.22           80%         34,00         658,00         0.13         11,7         0.40         6,10         14,8         83,72         5,24         1.79           AB         34,00         473,28         20,80         0,13         9,22         23,12         0,40         0,00         0,148         83,72         5,24         1.79           Total         89,00         473,28         20,80         0,13         9,22         23,12         0,40         0,00         0,148         13,09         3,28,3         0,57           Total         89,00         946,33         6,10         80,10         13,09         32,43         13,13,4         2,57		3k I bs Thrust	-	38.33	140.92	- 1.99	6.34	10.54	0.54	00.0	1.91	80'9	10.10	0.52	00.0
Idle         52.00         10.40         79.53         58.18         1.16         137.34         0.40         12.38         31.46         0.63         74.27         0.22           80%         34.00         131.60         658.00         0.13         18.71         1.17         0.40         6.10         1.48         83.72         5.24         1.79           AB         3.00         477.28         208.80         0.13         9.22         23.12         0.40         0.00         0.18         81.09         32.83         0.57           Total         89.00         946.33         12.34         2.57         257		Total			773.49					Per Test	23,55	53.03	39.98	2.84	0.00
Idle         52.00         10.40         79.53         58.18         1.16         137.34         0.40         12.38         31.46         0.63         74.27         0.22           80%         34.00         131.60         658.00         0.33         18.71         1.17         0.40         6.10         1.48         83.72         5.24         1.79           AB         3.00         477.28         208.80         0.13         9.22         23.12         0.40         0.00         0.18         13.09         32.83         0.57           Total         89.00         946.33         12.34         2.57         257												Contraction of the			
80%         34.00         131.60         658.00         0.33         18.71         1.17         0.40         6.10         1.148         83.72         5.24         1.79           AB         3.00         473.28         208.80         0.13         9.22         23.12         0.40         0.00         0.18         13.09         32.83         0.57           Total         89.00         946.33         12.34         2.57         2.57	F404-GE-400	Idle	52.00	10.40	79.53	58.18	1.16	137.34	0.40	12.38	31.46	690	74.27	0.22	6.70
A/B 3.00 473.28 208.80 0.13 9.22 23.12 0.40 0.00 0.18 13.09 32.83 0.57 7.012 89.00 946.33 0.57 7.43 2.57	(F/A-18)	%0 <b>8</b>	34.00	131.60	658.00	0.33	18.71	1.17	0.40	6.10	1.48	83.72	5.24	1.79	27.29
89.00 946.33 F 2.57 112.34 2.57	(2 )	A/B	3.00	473.28	208.80	0.13	9.22	23.12	0.40	00.0	0.18	13.09	32.83	0.57	0.00
		Total	80 08		946.33					Per Test	33,12	97.43	112.34	2.57	33.99

(1) Power setting and time in power setting provided by COMNAVAIRLANT.

(2) Assumes a product density of 6.8 lb/gallon for JP-5.

(3) Data for calculating modal emission rates provided by the Navy Aircraft Environmental Support Office.

(4) Aircraft VOC reported as HC in the form CHy/x

(5) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Key:

A/B Max. = maximum afterburner IRP = intermediate rated power (same as military) 75% = 75% throttle setting

02/17/98 03:17 PM

# EMISSIONS FROM AIRCRAFT ENGINE TESTING AT NAS OCEANA - ARS \$ FOR 1993 AND 1996-1999 Table F-55

Number of		VOC	2)	Z	iON .		2	75	803	20	DM10
Tests/Year	<u> </u>			per test				per test	1		- 1
Ξ		<b>a</b>	CLEX	(lb)	CTPY	(B)	(TPY)	(ap)	(TPY)	(qp)	(TPY)
11	Case I	99.61	0.76	02/211	4.56	216.70	8.39	10.85	0.42	20.91	0.81
99	-	46.34	1.52	399.66	13.12	486.33	15.97	12.27	0.40	44.73	1.47
83	82.1	23.55	0.98	53.03	2.21	36.68	1.66	2.84	0.12	0.00	000
		Total	3.26		19.89		26.03		0.94		2.28
8		99.61	0,89	117.70	5.30	216.70	9.76	10.85	0.49	20.91	0.94
82		46.34	1.91	399.66	16.47	486.33	20.04	12.27	0.51	44.73	184
0	30A	33.12	0.00	97.43	0.00	112.34	00:0	2.57	0.00	33.99	000
4	-30	23.55	910	\$3.03	0.36	39.98	0.27	2.84	0.02	0.00	000
		Total	2.95		22.13		30.07		1.01		2.78
92		19.66	060	117.70	5.41	216.70	9.97	10.85	0.50	20.91	96.0
123		46.34	2.85	399,666	24.58	486.33	29.91	12.27	0.75	44.73	2.75
0		33.12	0.00	97.43	000	112.34	00:00	2.57	0.00	0.00	0.00
		Total	3.75		29.99	1000	39.88		1.25		3.71
	200										
09	32	19.66	0.59	117.70	3.53	216.70	6.50	10.85	0.33	20.91	0.63
180	- 34	46.34	417	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
298	12	33.12	4.94	97.43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
	2	Total	9.70		54.02		67.01		1.81	:	9.72
	्र								:		
09		19.66	0.59	117.70	3,53	216.70	6.50	10.85	0.33	20.91	0.63
081	954	46.34	4.17	399.66	35.97	486.33	43.77	12.27	1.10	44.73	4.03
298		33.12	4.94	97,43	14.52	112.34	16.74	2.57	0.38	33.99	5.06
<u></u>	- 11	Loren			44 A7		10.13		1 01		5

- (1) Number of engine tests per F-14A, F-14B/D, and F/A-18 aircraft from U.S. Navy (1997) and Wyle (1997). Number of A-6 engine tests per aircraft assumed to be the same as F-14A engine tests per aircraft.

  (2) Aircraft engine emissions of VOC reported as HC in the form CHy/x

  (3) Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

  (4) Adversary squadron engine tests not conducted at Oceana due to lack of F404 test equipment.
- (5) Includes adversary squadron test cell events due to installation of F404 test equipment at NAS Oceana. Key:

  VOC = volatile organic compounds
  - VOC = volatile organic compounds
    - NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

Table F-56	PARKING LOT CONSTRUCTION (4 LOTS) AND AIRCRAFT AFRON - ARS S Equipment Exhaust Emissions
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	Equipment	Days		Emission	Emission Factors (lb/1000 gal)	0 gal)			EMIS	EMISSIONS (lbs)		
Equipment List	quantity	Osed	NOX	, voc	8	802	PM10	NOx	voc	00	802	PM10
Crane	0	0	403	35.0	82.0	31.2	27	0.0	0.0	0.0	0.0	0.0
Backhoe Loader	2	45	395	39.0	133.0	31.2	27	1777.5	175.5	598.5	140.4	121.5
Pan Scraper		20	340	9.61	2.76	31.2	27	340.0	. 9.6	7.76	31.2	27.0
Hi-Lift	0	0	364	31.0	121.0	31.2	25	0.0	0.0	0.0	0:0	0.0
Front-end Loader, wheels	-	45	403	23.5	94.0	31.2	29	8.906	52.9	211.5	70.2	65.3
Pile Driver	0	0	403	35.0	82.0	31.2	24	0'0	0.0	0.0	0.0	0.0
Track loader	-	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Grader	2	45	375	43.0	74.3	31.2	22	1687.5	193.5	334.4	140.4	0.66
Bulldozer	2	45	375	43.0	74.3	31.2	25	1687.5	193.5	334.4	140.4	112.5
Compactor	m	45	364	31.0	121.0	31.2	24	2457.0	209.3	816.8	210.6	162.0
Roller	3	45	364	31.0	121.0	31.2	24	2457.0	209.3	816.8	210.6	162.0
Paver	_	45	403	23.5	125.0	31.2	29	8:906	52.9	281.3	70.2	65.3
The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon												
haul trk/cement mixer, mob(gm/	4	45	8.0	2.1	9.93	2.8	2.15	317.2	83.3	393.7	111.0	85.2
haul trk/cement mixer, idl(gm/hr	r 4	45	13.2	16.2	40.2	0	0	10.5	12.8	31.9	0.0	0.0
		******					Total, lb/yr	12547.6	1202.5	3916.7	1125.0	899.7
							Total TPV	£27	עעע	1.96	920	0.45

VOC = volatile organic compounds NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

## NEW BUILDING/ADDITION CONSTRUCTION - ARS 5 Equipment Exhaust Emissions Table F-56

	Equipment	Days		Emission F	Emission Factors (lb/1000 gal	gal)			EMI	EMISSIONS (lbs)		
EQUIPMENT LIST	quantity	Used	NOx	NOC	00	802	PM10	NOX	VOC	CO	802	PM10
Crane	-	120	403	35.0	82.0	31.2	27	2418.0	210.0	492.0	187.2	162.0
Backhoe Loader	2	120	395	39.0	133.0	31.2	27	4740.0	468.0	1596.0	374.4	3240
Pan Scraper	-	120	340	9.61	7.76	31.2	27	2040.0	117.6	586.2	187.2	162.0
Hi-Lift	2	120	364	31.0	121.0	31.2	25	4368.0	372.0	1452.0	374.4	3000
Front-end Loader, wheels	-	120	403	23.5	94.0	31.2	. 29	2418.0	141.0	564.0	187.2	174.0
Pile Driver	0	0	403	35.0	82.0	31.2	24	0.0	0.0	0.0	0.0	00
Track loader	0	0	391	23.5	94.0	31.2	24	0.0	0.0	0.0	0.0	0.0
Grader	1	120	375	43.0	74.3	31.2	22	2250.0	258.0	445.8	187.2	133.0
Bulldozer	2	120	375	43.0	74.3	31.2	25	4500.0	516.0	8916	374.4	300 0
Compactor	-	120	364	31.0	121.0	31.2	24	2184.0	186.0	726.0	187.2	144.0
Roller	0	0	364	31.0	121.0	31.2	24	0.0	0.0	0.0	0.0	00
Paver	0	0	403	23.5	. 125.0	31.2	29	0.0	0.0	0.0	0.0	00
									T			:
naul trk, mob(gm/mi)	7	120	8.0	2.1	9.93	2.8	2.15	1480.2	388.5	1837.3	518.1	307.8
haul trk, idl(gm/hr)	7	120	13.2	16.2	40.2	0	0	48.8	59.9	148.8	0.0	0.0
							Total Lb/yr	26447.0	1.7172	8739.6	2577.3	2095.8
							Total TPV	13.22	1 36	72.7	· •	100

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide SO2 = sulfur dioxide PM10 = particulate matter

### TPY **EMISSIONS SUM** 1.12 LBS/YR 2232.8 ANNUAL DEMOLITION PARTICULATE EMISSIONS - ARS 5 REMOVAL (LBS) REMOVAL (LBS) ACTIVITY (LBS) VEHICLE 2042.6 Table F-57 DEBRIS 180.4 STRUCTURE 9.8 Floor Space (SQ FT) 191,887

Notes:

Demolition square ft assumed = 10 % of new construction sq ft PM emission from structure takedown based on sq ft \*EF PM emission from debris removal based on sq ft \*EF PM emission from on-site vehicle activity based on sq ft \*EF Pushing (bulldozing) PM emission put under site prep spreadsheet Reference EPA-450/2-92-004 (Fugitive Dust document) (all EF's in EPA document converted to english units)

	EANA - ARS 5	<b>EMISSIONS SUM</b>	AdL	0.93
	N AT NAS OCI	EMISSIC	LBS/YR	1868
	ANNUAL SITE PREPARATION PARTICULATE EMISSIONS FOR CONSTRUCTION AT NAS OCEANA - ARS 5	PAN SCRAPING	(LBS) SOIL REMOV(LBS) ETHIMOVING (LBS) LBS/YR	444
Table F-57	LATE EMISSIONS F	ACRES ACTIVITY BULLDOZIN PAN SCRAPING PAN SCRAPING	SOIL REMOV(LBS)	704
	ION PARTICU	BULLDOZIN	(LBS)	720
	E PREPARAT	ACTIVITY	DAYS	120
	ANNUAL SIT	ACRES		44

Notes:

Acreage estimate based on building sq ft\*2
Estimate activity days for preferred, develop ratio days:acres
Apply ratio to ARS acreages to get activity days
Bulldozing pm emissions based on 8hr/activity day \* EF (EPA 1992)
Soil removal emiss based on VMT/acre \*acres\*EF (EPA 1992)
Earthmoving emiss based on soil removal miles \*3 (BEE)\*EF
EPA 1992 is Fugitive Dust BG document (EPA-450/2-92-004)

	Table F-58			
Total Co	Total Construction Emissions (Exhaust and Dust) - ARS 5	Dust) - ARS		
Project/Source	Emi	Emissions (tons/yr)	r)	
Engine Exhaust Emissions	VOC	ည	SOx	PM10
Parking Lot Construction	0.60	1.96	0.56	0.45
Building/Addition Const. (total)	1.36   13.22	4.37	1.29	1.05
Demolition/Construction Activity		-		
Mechanical dust Generation	00.00	0.00	0.00	2.05
Total	1,96	6.33	1.85	3.55

Kev

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide

CO = carbon monoxide SO2 = sulfur dioxide

PM10 = particulate matter

Control   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column   Column					EN	<b>EMISSIONS</b>	SUMMA	RY - NAS	OCEANA	AND NA	LF FENT	ONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 5	<b>SS</b>			
YOCG         NOT         CO         SOQ         PM10         YOCG         NOS         CO         SOQ         PM10           names:         sames:         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft         craft								FOR 19	93 AND 19	996-1999						
Special Solution         VOGS         NOR         CO         SO2         PM10         VOGS         NOR         CO         SO2         PM10           ana::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::         Sina::<				1993					1996					1997		
sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:         Sense:<	irce Type	VÓCs	NOX	93	S02		VOCs	NOX	9	802	PM10	VOCs	NOX	ည	S02	PM10
Procest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:         Storest:	S Oceana:															
Poetations         500,57         353.51         1,018.55         23.3.53         223.43         266.53         245.86         577.91         14.64         180.92           Polis Sources:         500,57         33.51         1,018.55         23.3.53         23.3.43         266.53         245.86         577.91         14.64         180.92           bile Sources:         51.3         26.43         26.53         245.86         577.91         14.64         180.92           bile Sources:         51.3         26.43         26.63         24.58         6.78         18.7         2.24           nee Rum-ups         71.97         165.99         131.90         5.65         46.27         30.13         311.19         65.36         3.91         48.77           seer Mobile         77.65         199.30         20.60         7.81         48.75         33.78         165.43         83.87         6.20         5.48           solutions         0.71         8.67         1.87         0.57         0.61         0.71         8.67         1.87         0.51         0.61           sylonices:         1.13         3.26         1.89         2.80         1.84         0.72         2.213         3.06	bile Sources:															:
craft         500.57         353.51         1,018.55         23.35         123.48         266.53         245.86         577.91         14.64         180.92           bile Sources:         5.13         26.43         72.65         1.71         2.00         3.09         27.35         1.70         1.84         2.24           nce Run-ups         5.13         26.43         17.05         1.81         27.35         1.84         2.24           se         6.55         6.89         1.48         0.45         0.48         0.45         0.48           ser Mobile         77.65         199.30         206.03         7.81         48.75         33.78         156.43         83.87         6.20         51.50           ser Mobile         77.65         199.30         206.03         7.81         48.75         33.78         165.43         83.87         6.20         51.50           ser Cells         7.52         18.31         22.09         3.84         0.78         29.13         7.52         23.76         3.63           set Cells         3.26         19.89         26.03         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	craft Operations	500.57	353.51		23.55	223.43	266.53	245.86	7.000	14.64	180.92	246.67	300.88	571.63	16.68	225.30
bile Sources:         5.13         26.43         72.65         1.71         2.00         309         27.35         17.03         1.84         2.24           nce Rum-ups         71.37         165.99         131.90         5.65         46.27         30.13         131.90         6.35         46.27         30.13         131.90         6.35         46.27         46.27         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77         48.77	tal Aircraft	500.57	353.51	1,018.55	23.55	223.43	266.53	245.86	1	14.64	180.92	246.67	300.88	571.63	16.68	225.30
Section of the contraction         5:13         26.43         72.65         1.71         2.00         3.09         27.35         17.03         1.84         2.24           sect Mobile         71.97         165.99         131.90         5.65         46.27         30.13         131:19         65.36         3.91         48.77           set Mobile         77.65         19930         206.03         7.81         48.75         33.78         165.43         83.87         6.20         51.50           \$Sources:         1.13         32.32         8.31         22.09         3.84         0.78         29.13         1.87         0.48           \$Sources:         0.71         8.67         1.87         0.57         0.61         0.718         8.67         1.87         0.57         0.61         0.718         8.67         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61         0.718         8.67         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61           st Cells         3.26         0.05         0.00         0.00         0.00         0.00         0.00         0.00         0.00	er Mobile Sources:													S.P.S.		
nce Run-ups         71.37         165.99         131.90         5.65         46.27         30.13         131.19         65.36         3.91         48.77           se Mobile         77.65         6.89         1.48         0.45         0.48         0.56         6.89         1.48         0.45         0.48           ser Mobile         77.65         19930         206.03         7.81         48.75         33.78         1.65.43         83.87         6.20         0.48           solutees:         1/13         32.32         8.31         22.09         3.84         0.78         29.13         7.52         23.76         3.63           sst Cells         3.25         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61           sst Cells         3.26         1.989         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	ш	5.13	26.43	72.65	1.71	2.00	3.09	27.35	17.03	1.84	2.24	4.57	34.01	18.73	2.20	2.66
system         0.56         6.89         1.48         0.45         0.48         0.56         6.89         1.48         0.45         0.48         0.56         6.89         1.48         0.45         0.48         0.56         6.89         1.48         0.45         0.48         0.56         6.89         1.48         0.45         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.48         0.57         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.52         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.51         0.52         0.51         0.52         0.52         0.52         0.52         <	intenance Run-ups	71.97	165.99	780.00	5.65	46.27	30.13	131.19	65.36	3.91	48.77	31.59	197.60	85.86	5.51	66.41
rer Mobile         77.65         199.30         206.03         7.81         48.75         33.78         165.43         83.87         6.20         51.50           v Sources:         1.13         32.32         8.31         22.09         3.84         0.78         29.13         7.52         23.76         3.63           sst Cells         0.71         8.67         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61           sst Cells         3.26         19.89         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	nerators	0.56	6.89		0.45	0.48	0.56	6.89	1.48	0.45	0.48	0.56	6.89	1.48	0.45	0.48
v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:         v. Sources:	tal Other Mobile	77.65	199.30	206.03	7.81	48.75	33.78	165.43	83.87	6.20	51.50	36.72	238.49	106.07	8.17	69.56
St Cells         3.232         8.31         22.09         3.84         0.78         2913         7.52         23.76         3.63           St Cells         0.71         8.67         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61           set Cells         3.26         19.89         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 </th <th>tionary Sources:</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	tionary Sources:															
sst Cells         3.26         19.89         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	lers:	1.13	32.32	8.31	22.09	3.84	0.78	29.13	7.52	23.76	3.63	0.78	29.13	7.52	23.76	3.63
sst Cells         3.26         1.87         0.57         0.61         0.71         8.67         1.87         0.57         0.61           sst Cells         3.26         19.89         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00																
Handling 0.66 0.00 0.00 0.00 0.00 0.00 0.00 0.0	1erators	0.71	8.67	1.87	0.57	0.61	0.71	8.67	1.87	0.57	0.61	2.11	27.87	7.27	3.77	2.21
set Cells         3.26         19.89         26.03         0.94         2.28         2.95         22.13         30.07         1.01         2.78           Handling         0.66         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00														1		
Handling         0.66         0.00         0.00         0.046         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00	gine Test Cells	3.26	19.89	26.03	0.94	2.28	2.95	22.13	30.07	1.01	2.78	3.75	29.99	39.88	1.25	3.71
Handling         0.66         0.00         0.00         0.00         0.046         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00																:
tionary 44.41 60.88 36.21 23.60 6.73 22.65 59.93 39.46 25.34 7.02 SO 622.64 613.70 12.60.78 54.97 278.91 322.96 47122 701.24 46.18 239.01 intress:	5 Fuel Handling	99.0	0.00	0.00	0.00	0.00	0.46	00.0	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
ation         19:35         0.00         0.00         0.00         4.46         0.00         0.00         0.00           19:30         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td< th=""><th></th><th></th><th></th><th></th><th> </th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>																
ion:         6.00         0.00         0.00         0.00         13.29         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <t< th=""><th>vice Station</th><th>19.35</th><th>0.00</th><th>0.00</th><th>0.00</th><th>0.00</th><th>4.46</th><th>0.00</th><th>0.00</th><th>0.00</th><th>0.00</th><th>4.67</th><th>0.00</th><th>0.00</th><th>0.00</th><th>0.00</th></t<>	vice Station	19.35	0.00	0.00	0.00	0.00	4.46	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00
ion:         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>****</th><th></th><th></th><th></th><th></th></th<>												****				
ry         44.41         60.88         36.21         23.60         6.73         22.65         59.93         39.46         25.34         7.02           ss:         13.48         146.63         37.00         6.81         30.87         77.25         147.41         19.39         6.14         39.01		19.30	0.00	0.00	0.00	0.00	13.29	00.0	0.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00
ry         44.41         60.88         36.21         23.60         6.73         22.65         59.93         39.46         25.34         7.02           ss:         13.48         146.63         37.00         6.81         30.87         77.25         147.41         19.39         6.14         39.01					1											
ry 44:41 60.88 36.21 23.60 6.73 22.65 59.93 39.46 25.34 7.02 622.64 613.70 1,260.78 54.97 278.91 322.96 471.22 701.24 46.18 239.44 is:	nstruction:	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	00:0	0.00	0.00	0.00
ry         44.41         60.88         36.21         23.60         6.73         22.65         59.93         39.46         25.34         7.02           ss:         622.64         613.70         1,260.78         54.97         278.91         322.96         471.22         701.24         46.18         239.44           ss:         13.48         146.63         37.00         6.81         30.87         7.25         147.41         19.39         6.14         39.01																
S: 622.64 613.70 1,260.78 54.97 278.91 322.96 471.22 701.24 46.18 239.44   S: 13.48 146.63 37.00 6.81 30.87 7.25 147.41 19.39 6.14 39.01	al Stationary	44.41	60.88	36.21	23.60	6.73	22.65	59.93	39.46	25.34	7.02	25.85	86.99	54.67	28.78	9.55
is:     13:48     146.63     37.00     6.81     30.87     7.25     147.41     19.39     6.14     39.01	al NASO		613.70	1,260.78	54.97	278.91	322.96	471.22	701.24	46.18	239.44	309.24	626.37	732.36	53.63	304.41
13.48 146.63 37.00 6.81 30.87 7.25 147.41 19.39 6.14 39.01	LF Fentress:															
	craft	13.48	146.63		6.81	30.87	7.25	147.41		6.14	39.01	7.73	175.88	19.05	6.88	47.82
309.78 330.21 618.63 720.63 52.32 278.46		636.12	760.33	1,297.79	61.78	309.78	330.21	618.63	720.63	52.32	278.46	316.97	802.24	751.41	60.51	352.23

		EMISSI	ONS SUM	MARY -	NAS OCE.	ANA AND	EMISSIONS SUMMARY - NAS OCEANA AND NALF FENTRESS - ARS 5	NTRESS.	· ARS 5	
			-	FO	FOR 1993 AND 1996-1999 (tons per year)	VD 1996-1 3r year)	666			
			1998					1999		
Source Type	VOCs	NOX	9	S02	PM10	VOCS	Vocs Nox	ည	S02	PM10
NAS Oceana:							•			
Mobile Sources:										
Aircraft Operations	358.07	392.83	70.606	19.75	279.52	464.91	461.02	1,195.05	22.70	323.82
Fotal Aircraft	358.07	392.83	909.07	19.75	279.52	464.91	461.02	1,195.05	22.70	323.82
Other Mobile Sources:										
GSE	3.67	34.57	17.17	2.32	2.79	3.69	34,56	17.22	1.73	1.92
Maintenance Run-ups	34.87	189.02	100.83	3.62	60.81	34.87	189.02	100.83	4.99	60.81
Generators	0.56	6.89	1.48	0.45	0.48	0.56	68.9	1.48	0.45	0.48
Total Other Mobile	39.11	230.48	119.48	6.39	64.08	39.12	230.56	119.53	7.18	63.21
Stationary Sources:										
Boilers:	0.62	27.13	89.9	22.82	3.38	0.62	27.13	89.9	22.82	3.38
Generators	2.11	27.87	7.27	3.77	2.21	2.11	27.87	7.27	3.77	2.21
Engine Test Cells	9.70	\$4.02	10.79	1.81	9.72	9.70	54.02	67.01	1.81	9.72
P-5 Fuel Handling	0.81	0.00	0.00	0.00	0.00	06.0	0.00	0.00	0.00	0.00
Service Station	6.40	0.00	0.00	0.00	0.00	6.72	00'0	00.00	00.00	0.00
Painting	34.12	00'0	0.00	0.00	0.00	41.00	0.00	0.00	0.00	0.00
										;
Construction:	0.00	0.00	0.00	0.00	0.00	1.96	19.50	6.33	1.85	3.55
							7.00			
Total Stationary	53.76	109.02	80.96	28.40	15.31	63.01	128.52	87.29	30.25	18.86
Total NASO	450.94	732.33	1,109.51	54.54	358.90	567.04	820.10	1,401.87	60.12	405.88
NALF Fentress:										İ
Aircraft	7.99	209.95	21.85	7.85	60.41	8.75	232.88	24.86	8.60	70.37
Total Americal	469.09	36000 040 50 111136	1 121 26	62 30	410 21	Kerk AM	27 27 1 067 08 1 476 73	1 436 72	70 73	176 36

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

SO2 = sulfur dioxide. Key: VOC = volatile organic compounds. NOx = oxides of nitrogen.

CO = carbon monoxide.

JP-5 = jet fuel.PM10 = particulate matter. JP-5 GSE = Ground Support Equipment

		Table F-60			
NET EMISSIC	NET EMISSIONS CHANGE - NAS OCEANA AND NALF FENTRESS - ARS 5 (tons per year)	NAS OCEANA A (tons per year)	IND NALF F	ENTRESS - AR	ĸ,
Year	Vočs	NOX	00	802	PM10
NAS Oceana:					
1993	622.64	613.70	1260.78	54.97	278.91
1996	322.96	471.22	701.24	46.18	239.44
1997	309.24	626.37	732.36	53.63	304.41
1998	450.94	732.33	1109.51	54.54	358.90
6661	567.04	820.10	1401.87	60.12	405.88
Net Change:					
1993 to 1999	-55.60	206.40	141.08	5.16	126.97
NALF Fentress:				-	
1993	13.48	146.63	37.00	6.81	30.87
1996	7.25	147.41	19.39	6.14	39.01
1997	7.73	175.88	19.05	6.88	47.82
8661	7.99	209.95	21.85	7.85	60.41
6661	8.75	232.88	24.86	8.60	70.37
Net Change:					
1993 to 1999	4.73	86.25	-12.14	1.80	39.50
Net Change NAS Oceana and NALF Fentress:	pui				
1993 to 1999	-60.33	292.65	128.94	6.95	166.47

Note: Shaded areas indicate pollutants subject to emission budget requirements in the Hampton Roads maintenance plan.

Key:

VOC = volatile organic compounds

NOx = oxides of nitrogen CO = carbon monoxide

SO2 = sulfur dioxide PM10 = particulate matter

G

#### **Accident Potential Zones**

#### G.1 Introduction

The stated goals of the Air Installations Compatible Use Zones (AICUZ) Program are to protect the Navy and Marine Corps operational capabilities; to protect health, safety, and welfare of civilian and military personnel by discouraging land uses that are incompatible with aircraft operations; and to inform the public about the AICUZ program and seek cooperative efforts to minimize aircraft accident potential in the vicinity of military air installations.

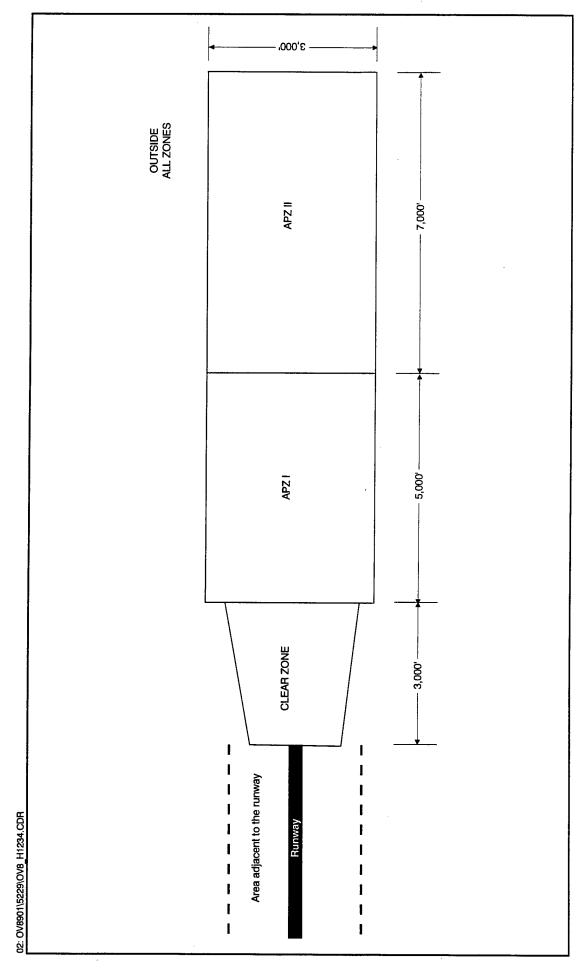
The accident potential zone (APZ) concept discusses the probable impact area if an accident occurs and not the probability of an accident occurring. In the 1950s, the first attempt to recognize the safety aspects of aircraft operations was identified in a report entitled, "The Airport and Its Neighbors, the Report of the President's Airport Commission."

Commonly referred to as the Doolittle Report, this report recommended that an area surrounding an airfield be set aside as a buffer in the event of aircraft accidents and areas beyond the ends of runways be kept free and clear of obstacles to flight. These areas are called clear zones (CZs) and are located immediately off the ends of the runways. These first steps toward controlling the land use close to an airport were designed to protect the pilot and his/her aircraft from obstructions and hazards that could impede the safe flight of the aircraft. Aircraft safety has evolved over the years to include measures to protect the safety of the people and property on the ground.

The AICUZ Program recognized these safety aspects and created the concept of APZs to promote compatible land use for the protection of people under aircraft flight paths.

Nearly 25 years ago, the Air Force collected and analyzed tri-service accident data between 1968 and 1972 to determine the geometric characteristics needed for effective CZs and APZs. The objective of this analysis was to identify patterns of accident occurrence; that is, to determine the percent of accidents contained within areas of specified length and width from the end of a runway. This analysis resulted in the definition of zones which exhibited the maximum concentration (percent) of accidents in the smallest area. The resultant zones are shown on Figure G-1. CZs are applied to all active runways and are trapezoidal in shape.

Located at the end of the runway, the CZs have the greatest potential for occurrence of aircraft accidents beyond the runway. APZs, located beyond the CZs, have a measurable potential for aircraft accidents and are applied to all flight tracks with a minimum of 5,000 aircraft operations.



AICUZ LAYOUT BASED ON TRI-SERVICE ACCIDENT DATA (1968-1972) Figure G-1

#### G.2 Aircraft Accidents (1968-1982) Update

In 1982, the Navy collected accident data to update the initial tri-service investigation and determine the applicability of the previously defined CZ and APZ configurations to then current aircraft operational procedures and those aircraft in the Naval aviation inventory. Data were collected from every Naval and Marine Corps Air Station to pinpoint the exact location of accidents from a common point of reference at the airfield. Only Class "A" accidents (i.e., those accidents where an aircraft suffered more than 1 million dollars in damage or a fatality occurred) were included in the study.

Fifty-five Naval and Marine Corps Air Stations reported 580 accidents for a 13-year period ending in January 1982. Each accident was categorized by type of operation, aircraft class, and location.

As shown in Table G-1, landing accidents occurred more frequently than takeoff accidents by a factor of three. The majority of accidents involved jet aircraft (7 out of every 10 accidents reported).

	ole G-1
	CORDED (1968-1982) s over 13 Years)
Operation Type	Percent of Total Accidents
Takeoffs	19.14
Landings	59.83
Unknown	21.03
Aircraft Type	Percent of Total Accidents
Jet ·	72.07
Turboprop/Piston	12.76
Rotary	15.17

Table G-2 and Figure G-2 provide total accident data by aircraft class and accident location. Unknown accidents (i.e., those accidents where operation and/or type of aircraft was not designated) accounted for more than 21% of all the accidents reported and were not included in Figure G-2. Of those accidents occurring on the runway, turboprop and piston aircraft had the highest percentage (48%) when compared on a relative scale. For accidents occurring adjacent to the runway, there was no predominant trend among the aircraft types.

		Table G-2		
	AICUZ AC	AICUZ ACCIDENT TABULATION (1968-1982) (Total Operations)	)N (1968-1982)	
Location	Total (%)	Jet (%)	Turboprop/Piston (%)	Rotary (%)
Runway	163 (35.6)	120 (33.6)	27 (48.2)	16 (35.6)
Adjacent Runway	92 (20.1)	72 (20.2)	10 (17.9)	10 (22.2)
Clear Zone	57 (12.4)	47 (13.2)	8 (14.3)	2 (4.4)
APZ I	31 (8.8)	25 (7.0)	4 (7.1)	2 (4.4)
APZ II	13 (2.8)	12 (3.4)	0 (0)	1 (2.3)
Out	102 (22.3)	81 (22.6)	7 (12.5)	14 (31.1)
TOTAL	458 (100)	357 (100)	56 (100)	45 (100)

Key:

Jet = Aircrast including A-4F, TA-4I, F-8I, F-4, T-28C, A-7A, F-14A, etc.

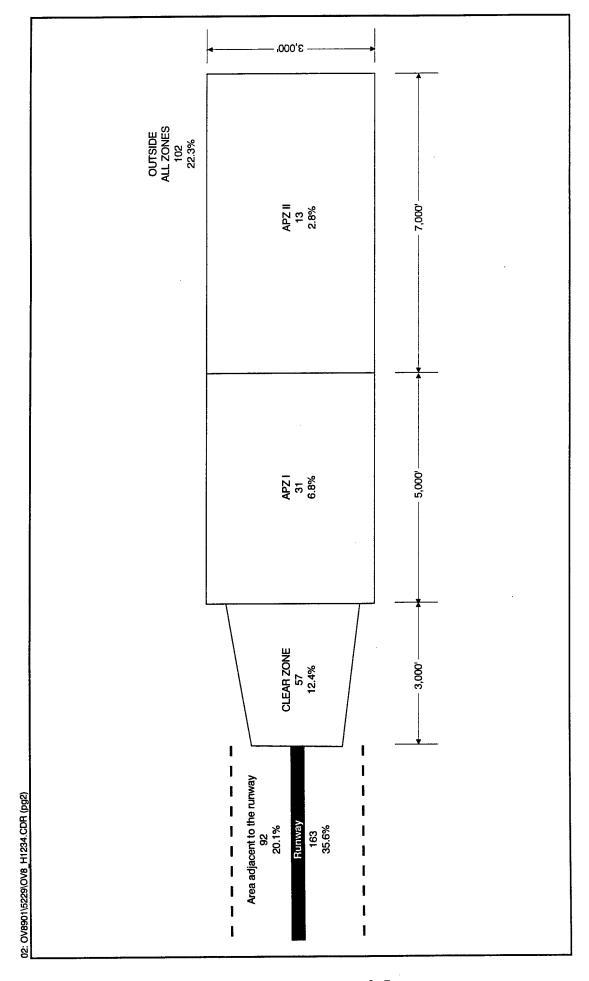


Figure G-2 ACCIDENT DATA (TOTAL OPERATIONS) BASED ON THE NAVY UPDATE OF THE TRI-SERVICE ACCIDENT DATA (1968-1982)

Accident rates in the CZ were similar for jet and turboprop/piston aircraft  $(\pm 14\%)$  but considerably lower for rotary wing aircraft (4%). Considering such factors as location of the helipad, dissimilar flight tracks, glide slopes, and maneuverability, some deviation between fixed wing aircraft and rotary wing aircraft was expected.

Approximately 7% of all the reported accidents occur in APZ I, and less than 3% occur in APZ II. The majority of accidents were on or adjacent to the runway (56%). The total percent of accidents occurring in the CZ and APZs was approximately equal to accidents occurring outside these zones (22%).

Tables G-3 and G-4 provide a detailed breakdown of accident data for takeoffs and landings, respectively. Figures G-3 and G-4 aggregate the takeoff and landing accident data by APZ.

Figure G-5 illustrates the total percent of accidents for each aircraft class versus distance from the threshold. This information provides the primary means for determining the applicability of the zones identified in the tri-service study to current operations. The total accident data for the three aircraft types is also shown. As expected, because there are more jet accidents than turboprop/piston or rotary wing aircraft accidents, the total operations curve is similar to the jet curve. The majority of accidents occurred within 15,000 feet of the threshold, and nearly 70% occurred within 3,000 feet. As a result, the study identified a CZ that extended to 3,000 feet; an APZ I that extended to 8,000 feet; and an APZ II that extended to 15,000 feet. These data are comparable to the earlier data.

#### G.3 Aircraft Accidents (1982-1997) Update

Aircraft accident data were updated for 1982 through December 1997. In that period, there were 101 aircraft accidents within a 5-mile radius of Navy and Marine Corps airfields located in the United States and Japan. Accidents were tabulated by the Naval Safety Center as occurring during takeoff, landing, and in-flight. Accidents classified as "takeoff" include aircraft accidents occurring during takeoff roll through initial climb segment (i.e., 10,000 feet AGL or assigned altitude). Landing accidents are those occurring during approach to the runway and entering the landing phase from pattern operations (e.g., touch-and-go, FCLP, etc.). Finally, in-flight accidents are not classified as takeoff or landing. Of the 101 aircraft accidents, 73 occurred on the airfield. The accident data are presented in Table G-5. As indicated in Table G-6, the number of F/A-18 accidents in the 15-year period since F/A-18 aircraft became a mainstay in the fleet is comparable to the level of accidents for other tactical

Key:

02:0V8901.D5229-08/22/97-D1

Jet = Aircraft including A-4F, TA-4J, F-8J, F-4, T-28C, A-7A, F-14A, etc.

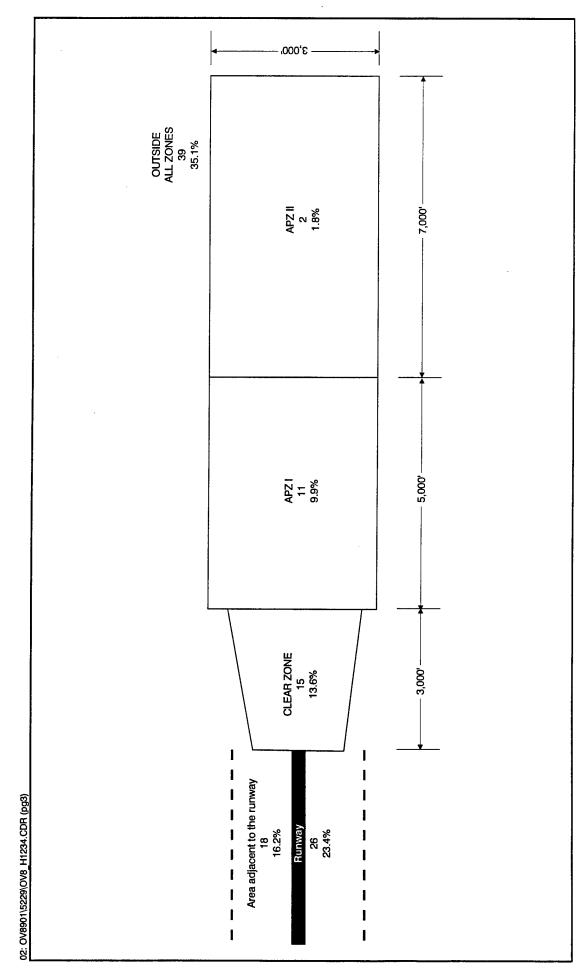


Figure G-3 ACCIDENT DATA FOR TAKEOFFS BASED ON THE NAVY UPDATE OF THE TRI-SERVICE ACCIDENT DATA (1968-1982)

Key:

02:0V8901.D\$229-08/22/97-D1

Jet = Aircraft including A-4F, TA-4J, F-8J, F-4, T-28C, A-7A, F-14A, etc.

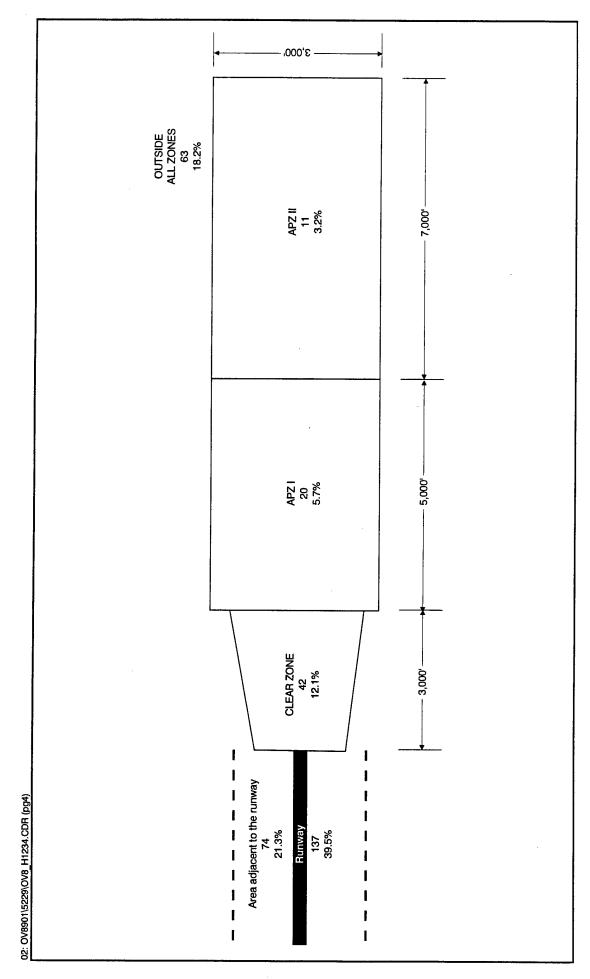


Figure G-4 ACCIDENT DATA FOR LANDINGS BASED ON THE NAVY UPDATE OF THE TRI-SERVICE ACCIDENT DATA (1968-1982)

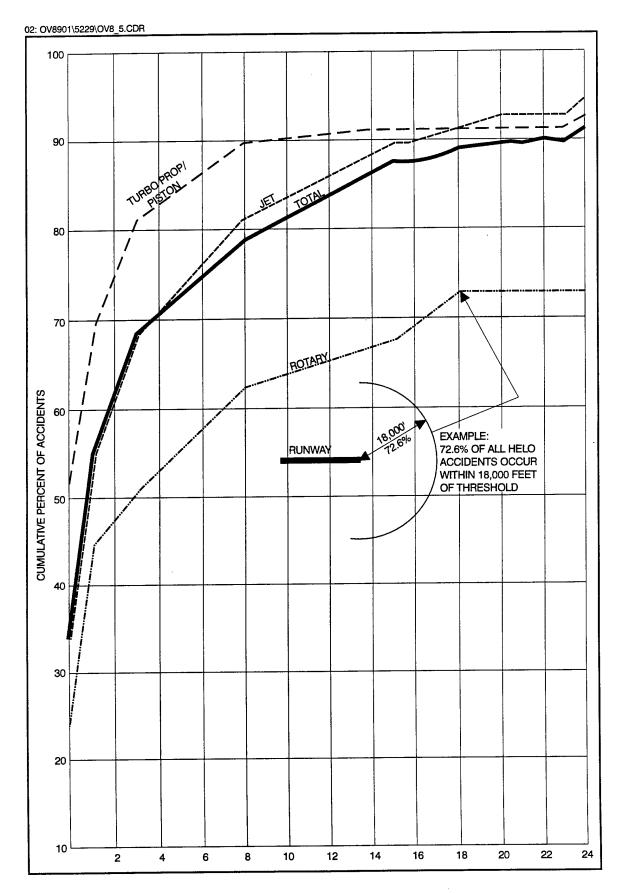


Figure G-5 PERCENT OF ACCIDENTS FOR EACH AIRCRAFT CLASS VERSUS DISTANCE FROM THRESHOLD (000 FT.)

aircraft. Hence, the introduction of F/A-18 squadrons is not expected to degrade safety in the environs of the airfield.

	Table	G-5	
	AIRCRAFT A (1982-		
	Fixe	d Wing	
Туре	Jet	Turboprop	Rotary Wing
Takeoff	28	2	2
In-flight	23	3	2
Landing	27	6	8

Tabl	e G-6
1	CRAFT ACCIDENTS -1997)
Aircraft Type	Number of Accidents
A-6	5
EA-6B	6
A-7	4
AV-8	18
A-4	12
F-14	8
F/A-18	12
T-2	5
T-34	4
OV-10	4
T-45	6
P-3	3
F-16N	1
Т-39	1

#### **G.4 Conclusion**

Based on these studies, aircraft accidents in the vicinity of military airfields show that the areas on/adjacent to the runway and along extended runway centerlines exhibit a greater potential for accidents compared to other areas in the vicinity of the airfield. Accordingly, recommended land use compatibility guidelines for APZs were developed and incorporated in the Navy's AICUZ Program instruction (US Navy 1988) and are presented in Table G-7.

Table G-7 SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES				
Land Use				
SLUCM No.	Name	Clear Zone	APZ 1	APZ 2
10 Residential				
11	Household units			
11.11	Single units: detached	N	N	Yª
11.12	Single units: semidetached	N	N	N
11.13	Single units: attached row	N	N	N
11.21	Two units: side-by-side	N	N	N
11.22	Two units: one above the other	N	N	N
11.31	Apartments: walk up	N	N	N
11.32	Apartments: elevator	N	N	N
12	Group quarters	N	N	N
13	Residential hotels	N	N	N
14	Mobile home parks or courts	N	N	N
15	Transient lodgings	N	N	N
16	Other residential	N	N	N <sup>a</sup>
20 Manufacturing				
21	Food and kindred products: manufacturing	N	Np	Y
22	Textile mill products: manufacturing	N	N <sup>b</sup>	Y
23	Apparel and other finished products made from fabrics, leather, and similar materials: manufacturing	N	N	N <sub>p</sub>
24	Lumber and wood products (except furniture): manufacturing	N	Уp	Y
25	Furniture and fixtures: manufacturing	N	Yb	Y
26	Paper and allied products: manufacturing	N	Yb	Y

Table G-7					
SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES					
	Land Use				
SLUCM No.	Name	Clear Zone	APZ 1	APZ 2	
30	Manufacturing (cont'd)				
27	Printing, publishing, and allied industries	N	Yb	Y	
28	Chemicals and allied products: manufacturing	N	N	Nb	
29	Petroleum refining and related industries	N	N	N	
31	Rubber and misc. plastic products: manufacturing	N	N <sup>b</sup>	N <sup>b</sup>	
32	Stone, clay, and glass products: manufacturing	N	Np	Y	
33	Primary metal industries	N	N <sup>b</sup>	Y	
34	Fabricated metal products:	N	N <sup>b</sup>	Y	
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks: manufacturing	N	N	N <sub>p</sub>	
39	Miscellaneous manufacturing	N	Y <sup>b</sup>	Y <sup>b</sup>	
40	Transportation, communication	, and utilities			
41	Railroad, rapid rail transit, and street railway transportation	N°	Y <sup>d</sup>	Y	
42	Motor vehicle transportation	N°	Y	Y	
43	Aircraft transportation	N°	Y <sup>d</sup>	Y	
44	Marine craft transportation	N°	Y <sup>d</sup>	Y	
45	Highway and street right-of-way	N°	Y	Y	
46	Automobile parking	N°	Y <sup>d</sup>	Y	
47	Communication	N <sup>c</sup>	Y <sup>d</sup>	Y	
48	Utilities	N°	Yd	Y	
49	Other transportation, communication, and utilities	N°	Y <sup>d</sup>	Y	

Table G-7 SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES					
Land Use					
SLUCM No.	Name	Clear Zone	APZ 1	APZ 2	
50	Trade				
51	Wholesale trade	N	Y <sup>b</sup>	Y	
52	Retail trade - building materials, hardware, and farm equipment	N	Y <sup>b</sup>	Y	
53	Retail trade - general merchandise	N	N <sup>b</sup>	Yb	
54	Retail trade - food	N	Nb	Уp	
55	Retail trade - automotive, marine craft, aircraft, and accessories	N	Yb	Y	
56	Retail trade - apparel and accessories	N	Np	Y <sub>p</sub>	
57	Retail trade - furniture, home furnishings, and equipment	N	Иp	Yp	
58	Retail trade - eating and drinking establishments	N	N	Np	
59	Other retail trade	N	N <sup>b</sup>	Yp	
60 Services					
61	Finance, insurance, and real estate services	N	N	Y <sup>f</sup>	
62	Personal services	N	N	Y <sup>f</sup>	
62.4	Cemeteries	N	γg	Yg	
63	Business services	N	Y <sup>h</sup>	Yh	
64	Repair services	N	Y <sup>b</sup>	Y	
65	Professional services	N	N	Y <sup>f</sup>	
65.1	Hospitals and nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Υ <sup>f</sup>	Y	
67	Governmental services	N	N	Y <sup>f</sup>	

Table G-7 SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES					
SOUGESTED	Land Use			APZ 2	
SLUCM No.	Name	Clear Zone	APZ 1		
60	Services (cont.)				
68	Educational services (i.e., schools)	N	N	N	
69	Miscellaneous services (e.g., religious facilities)	N	N <sup>b</sup>	Y <sup>b</sup>	
70	Cultural, Entertainment, and R	lecreational			
71	Cultural activities (including churches)	N	N	Nb	
71.2	Nature exhibits	N	Y <sup>b</sup>	Y	
72	Public assembly	N	N	N	
72.1	Auditoriums and concert halls	N	N	N	
72.11	Outdoor music shells and amphitheaters	N	N	N	
72.2	Outdoor sports arenas and spectator sports	N	N	N	
73	Amusements	N	N	Y <sup>h</sup>	
74	Recreational activities (incl. golf courses, riding stables, water recreation)	N	Y <sup>h,i,j</sup>	Y	
75	Resorts and group camps	N	N	N	
76	Parks	N	Y <sup>h</sup>	Y <sup>h</sup>	
79	Other cultural, entertainment, and recreation	N .	Y <sup>i</sup>	Y <sup>i</sup>	
80 Resource Production and Extraction					
81	Agriculture (except livestock)	Y	Y	Y	
81.5 81.7	Livestock farming and animal breeding	N	Y	Y	
82	Agricultural-related activities	N	Уe	Y	
83	Forestry activities and related services	Ne	Y	Y	
84	Fishing activities and related services	Ne	Ye	Y	

Table G-7 SUGGESTED LAND USE COMPATIBILITY IN ACCIDENT POTENTIAL ZONES					
Land Use					
SLUCM No.	Name	Clear Zone	APZ 1	APZ 2	
80 Resource Production and Extraction (cont.)					
85	Mining activities and related services	N	Ye	Y	
89	Other resource production and extraction	N	Ye	Y	

<sup>&</sup>lt;sup>a</sup> Suggested maximum density is one to two dwelling units per acre, possibly increased under a Planned Unit Development (PUD) where maximum lot coverage is less than 20%.

#### Key:

SLUCM = Standard Land Use Coding Manual.

b Within each land use category, uses exist where further evaluation may be needed due to the variation of densities of people and structures. For example, where a small neighborhood retail store may be compatible in APZ 2, a shopping center or strip shopping mall would be incompatible because of the density of development and concentration of people.

<sup>&</sup>lt;sup>C</sup> The placing of structures, buildings, or aboveground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See NAVFAC P-80.3 (NOTAL) for specific guidance.

d No passenger terminals and no major aboveground transmission lines in APZ 1.

<sup>&</sup>lt;sup>e</sup> Factors to be considered: labor intensity, structural coverage, explosive characteristics, air pollution.

f Low-intensity office uses only. Meeting places, auditoriums, etc., not recommended.

g Excludes chapels.

h Facilities must be low in intensity.

i Clubhouse not recommended.

J Large classes not recommended.

Н			Noise

#### H.1 General

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (e.g., music) or unpleasant (e.g., jackhammers) depends largely on the listener's current activity, past experience, and attitude toward the source of that sound.

The measurement and human perception of sound involves three basic physical characteristics - intensity, frequency, and duration. First, intensity is a measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder the perception of that sound. The second important physical characteristic is sound frequency, which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. The third important characteristic of sound is duration or the length of time the sound can be detected.

Aircraft noise consists of two major sound sources: aircraft takeoffs and landings and engine maintenance operations or run-ups. The former can be described as intermittent sounds and the latter as continuous.

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times larger than those of sounds that can just be detected. Because of this vast range, using a linear scale to represent the intensity of sound becomes very unwieldy. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

Because of the logarithmic nature of the decibel unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

- 60 dB + 60 dB = 63 dB, and
- 80 dB + 80 dB = 83 dB.

Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

• 60.0 dB + 70.0 dB = 70.4 dB.

Because the addition of sound levels is different than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition". The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain day-night average sound level. Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level of 100 dB which lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90% decrease in sound intensity but only a 50% decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

Sound frequency is measured in terms of cycles per second (cps), or hertz (Hz), which is the preferred scientific unit for cps. The normal human ear can detect sounds that range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. In measuring community noise, this frequency dependence is taken into account by adjusting the very high and very low frequencies to approximate the human ear's lower sensitivity to those frequencies. This is called "A-weighting" and is commonly used in measurements of community environmental noise.

If sound levels are measured using A-weighting, they are called A-weighted sound levels. If sound levels are measured without any frequency weighting, they are called sound levels. Most environmental impact analysis documents deal only with A-weighted sound levels; therefore, the adjective "A-weighted" is often omitted. In this case, A-weighted sound levels are also referred to as sound levels. In some instances, levels that have been

A-weighted are identified by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms "sound level" and "A-weighted sound level" or by the units dB, dBA, and dB(A).

This document presents A-weighted sound levels, but the adjective "A-weighted" has been omitted.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common - one second and one-eighth of a second. A measured sound level averaged over one second is called a slow response sound level; one averaged over one-eighth of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective "slow response" is usually omitted. The proper descriptor "slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

#### **H.2 Noise Metrics**

A "metric" is defined as "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that quantitatively measures the <u>effect</u> of noise on the environment. Noise studies have typically involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics.

Recently, however, various federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analysis documents, and both the Department of Defense and the Federal Aviation Administration have specified those which should be used for federal aviation noise assessments. These metrics are as follows.

#### **Maximum Sound Level**

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level. It is usually abbreviated by ALM,  $L_{max}$ , or  $L_{Amax}$ .

The maximum sound levels of typical events are shown in Figure H-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

### Sound Exposure Level

Individual time-varying noise events have two main characteristics - a sound level that changes throughout the event and a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or  $L_{AE}$ ) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the sound exposure level of an overflight is usually greater than the maximum sound level of the overflight.

Note that sound exposure level is a composite metric that represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that sound exposure level measures this impact much more reliably than just the maximum sound level.

# **Day-Night Average Sound Level**

Time-average sound levels are measurements of sound levels that are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or  $L_{\rm dn}$ ) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-decibel adjustment added to those noise events that take place between 10:00 p.m. and 7:00 a.m. the following morning. This 10-decibel "penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

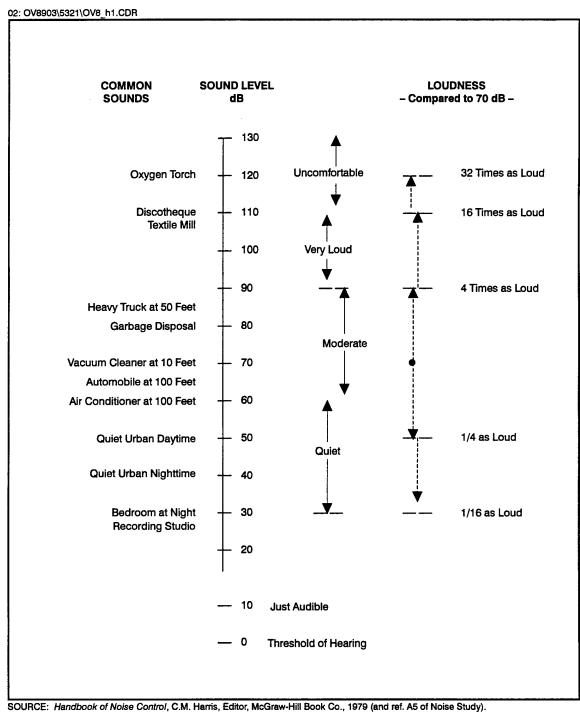


Figure H-1 TYPICAL A-WEIGHTED SOUND LEVELS OF COMMON SOUNDS

Day-night average sound level is the continuous A-weighted sound level that would be present if all of the variations in sound level that occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

Day-night average sound level provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels that occur during the day. For example, a day-night average sound level of 65 dB could result from a very few noisy events or a large number of quieter events.

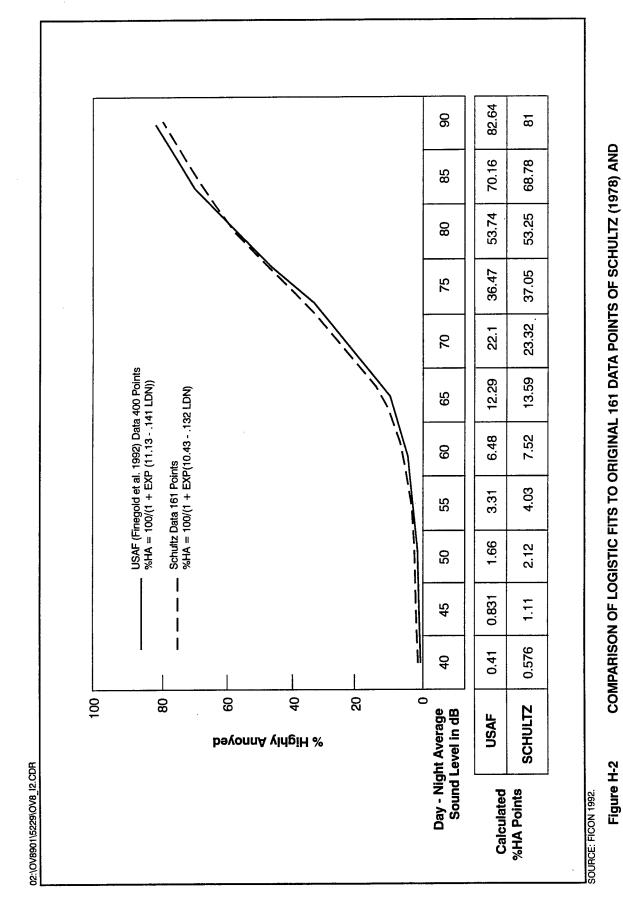
As noted earlier for sound exposure level, day-night average sound level does not represent the sound level heard at any particular time but rather represents the total sound exposure. Scientific studies and social surveys conducted to determine community annoyance to all types of environmental noise have found the day-night average sound level to be the best measure of that annoyance. Its use is endorsed by the scientific community (see References H1 through H5).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of day-night average sound level. This is illustrated in Figure H-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in day-night average sound level.

Reference H6, the source for Figure H-2, was published in 1978. A more recent study has reaffirmed this relationship (Reference H7). In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low (i.e., 0.5 or less). This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using day-night average sound level.

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. Reference H8 reported the reactions of individuals in a community to daily helicopter overflights, ranging from one to 32 per day. The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of day-night average sound level has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the



COMPARISON OF LOGISTIC FITS TO ORIGINAL 161 DATA POINTS OF SCHULTZ (1978) AND USAF ANALYSIS WITH 400 POINTS (data provided by USAF Armstrong Laboratory)

measurement or calculation of  $L_{dn}$ . One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to "meaningless" time-average sound levels.

In fact, a time-average noise metric, such as  $L_{dn}$ , takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The day-night average sound level for this 24-hour period is 65.5 dB. Assume, as a second example, that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The day-night average sound level for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

### Onset-Rate Adjusted Day-Night Average Sound Level

Sound levels along MTRs and in restricted areas and MOAs generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, overflights along MTRs are highly sporadic, ranging from 10 per hour to less than one per week. To accurately represent the impacts of these operations, the Ldn metric is adjusted to account for the surprise or startle effect experienced from these high-speed, low-altitude operations. The adjusted Ldn is designated as the onset-rate adjusted day-night average sound level (Ldnr). For aircraft noise events exhibiting an onset rate (the increase in sound level) of 15 to 30 dB per second, a penalty of 0 to 5 dB is added to normal sound exposure levels (Wyle Labs 1997).

Because of the sporadic nature of these operations, the number of daily operations is determined from the number of flying days in the calendar month with the highest number of operations in the affected airspace or MTR in order to avoid seasonal periods of low activity. This monthly average is denoted Ldnmr. The DoD uses the program MR\_NMAP to calculate Ldnmr values for MTRs and special use airspace.

### **H.3 Noise Effects**

### H.3.1 Hearing Loss

Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) is a time-average sound level of 70 dB over a 24-hour period. Because it is unlikely that airport neighbors will remain outside their homes 24 hours per day for extended periods of time, there is little possibility of hearing loss below a day-night average sound level of 75 dB, and this level is extremely conservative.

### **H.3.2 Nonauditory Health Effects**

Most studies of nonauditory health effects of long-term noise exposure have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. One of the best scientific summaries of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22 to 24 January 1990 in Washington, D.C.:

"The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardio-vascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an 8-hour day). At the recent (1988) International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem but also any potential non-auditory health effects in the work place." (Reference H10; parenthetical wording added for clarification.)

Although these findings were specifically directed at noise effects in the workplace, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and

often contradictory. Yet, even those studies that purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two UCLA researchers apparently found a relationship between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Reference H11). Nevertheless, three other UCLA professors analyzed those same data and found no relationship between noise exposure and mortality rates (Reference H12).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects for 1970 to 1972 when compared with a control group residing away from the airport (Reference H13). Based on this report, a separate group at the Center for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport (ATL) for 1970 to 1972 and found no relationship in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Reference H14).

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

# H.3.3 Annoyance

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the U.S. Environmental Protection Agency as any negative subjective reaction on the part of an individual or group (Reference H3). As noted in the discussion of day-night average sound level above, community annoyance is best measured by that metric.

## H.3.4 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and irritation. The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Research has shown that the use of the sound exposure level metric will successfully measure speech interference and that a sound exposure level exceeding 65 dB will begin to interfere with speech communication.

### H.3.5 Sleep Interference

Sleep interference is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy.

Sleep interference may be measured in either of two ways. "Arousal" represents actual awakening from sleep, while a change in "sleep stage" represents a shift from one of four sleep stages to another stage of lighter sleep without actual awakening. In general, arousal requires a somewhat higher noise level than does a change in sleep stage.

A recent analysis sponsored by the U.S. Air Force summarized 21 published studies concerning the effects of noise on sleep (Reference H15). The analysis concluded that a lack of reliable studies in homes, combined with large differences among the results from the various laboratory studies, did not permit development of an acceptably accurate assessment procedure. The noise events used in the laboratory studies and in contrived in-home studies were presented at much higher rates of occurrence than would normally be experienced in the home. None of the laboratory studies were of sufficiently long duration to determine any effects of habituation, such as that which would occur under normal community conditions.

Nevertheless, some guidance is available in judging sleep interference. The U.S. Environmental Protection Agency identified an indoor day-night average sound level of 45 dB as necessary to protect against sleep interference (Reference H3). Assuming a very conservative structural noise insulation of 20 dB for typical dwelling units, this corresponds to an outdoor day-night average sound level of 65 dB minimizing sleep interference.

In 1992, the Federal Interagency Committee on Noise (FICON) addressed the issue of sleep disturbance prediction. FICON adopted an interim curve developed by the U.S. Air Force based on available data including home and laboratory studies (Reference H16). Subsequently, in 1997, the Federal Interagency Committee on Aviation Noise (FICAN) amended its earlier position and adopted a new interim guideline for sleep awakening prediction. The new curve, based on recent studies in England and at two U.S. airports (Los Angeles International and Denver International), concluded that the incidence of sleep awakening from aircraft noise was less than previously identified. Using indoor single-event noise levels represented by SELs, potential sleep awakening can be predicted using the curve presented in Figure H-3. For example, maximum sound levels (Lmax) for an F/A-18 conducting touch-and-go or FCLPs is 97 dB (see Table 4.8-5). As noted in Section 3.1.8, the SEL is usually greater than the Lmax because SEL includes the duration of the event. Typical SELs are 10 dB greater than Lmax for flyover events. Therefore, for the F/A-18 touch-and-go or FCLP Lmax of 97 dB, the corresponding outdoor SEL would be 107 dB.

Typically, homes in the United States provide 15 dB of sound attenuation with windows open and 25 dB with windows closed and air conditioning operating. Hence, the outdoor SEL of 107 dB would be 92 dB indoors with windows open and 82 dB indoors with windows closed and air conditioning operating. Using Figure H-3, the potential sleep awakening would be 15% with windows open and 10% with windows closed in the above example.

The new FICAN curve does not address habituation over time by sleeping subjects and is applicable only to adult populations. Nevertheless, this curve provides a reasonable guideline for assessing sleep awakening.

#### H.3.6 Noise Effects on Domestic Animals and Wildlife

Animal species differ greatly in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature, and its hearing ability usually reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include nonauditory effects similar to those exhibited by humans - stress, hypertension, and other nervous disorders. Tertiary effects may include interference with mating and resultant population declines.

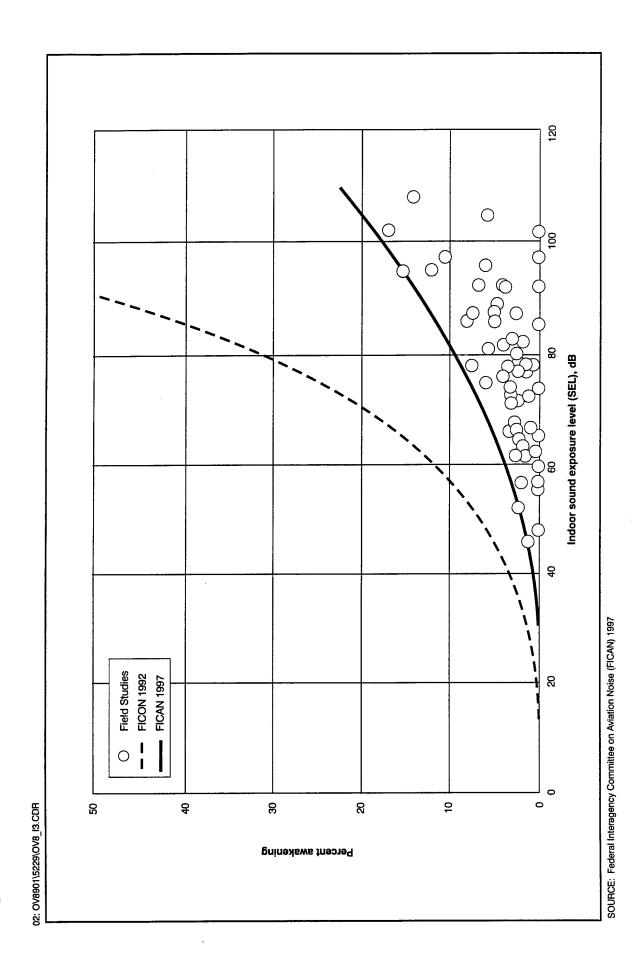
Many scientific studies are available regarding the effects of noise on wildlife and some anecdotal reports of wildlife "flight" due to noise. Few of these studies or reports include any reliable measures of the actual noise levels involved.

In the absence of definitive data on the effect of noise on animals, the Committee on Hearing, Bioacoustics, and Biomechanics of the National Research Council has proposed that protective noise criteria for animals be taken to be the same as for humans (Reference H18).

# **H.3.7 Noise Effects on Structures**

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of the excitation of structural component resonances. While certain frequencies (such as 30 hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (Reference H19).

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle", of objects within the dwelling – hanging



RECOMMENDED SLEEP DISTURBANCE DOSE-RESPONSE RELATIONSHIP Figure H-3

pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise. In general, such noise-induced vibrations occur at sound levels of 110 dB or greater. Thus, assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

#### H.3.8 Noise Effects on Terrain

It has been suggested that noise levels associated with low-flying aircraft may affect the terrain under the flight path by disturbing fragile soil or snow structures, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

# H.3.9 Noise Effects on Historical and Archaeological Sites

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Again, there are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport (IAD). These measurements were made in connection with the proposed scheduled operation of the supersonic Concorde airplane at Dulles (Reference H18). There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning.

As noted above for the noise effects of noise-induced vibrations of normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

#### H.4 References

This appendix was modified from Wyle 1997.

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